Economic Growth with Price Deflation

1873–1896

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ECONOMIC GROWTH WITH PRICE DEFLATION, 1873–1896

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Contents

Abstract iii
Acknowledgements v
1 Introduction 1
2 Deflation and Growth: Some Theoretical Considerations 5
3 Growth of Output 27
4 Prices and the Money Supply 41
5 Trends in Growth 67
6 Agriculture and Falling Prices 79
7 Growth in the Industrial Sector 95
8 Real Wages and Income Distribution 105
9 Summary and Conclusions 127
Selected Bibliography 137

Abstract

The belief that deflation, or falling prices, is incompatible with rapid economic growth has gained widespread acceptance. Thi3 belief holds that the price of labor, or the money wage rate, is inflexible in a downward direction. When product prices fall, the failure of wages to fall will result in reduced profits or even losses. At the same time, deflation increases the real burden of pre-existing debt by increasing the amount of purchasing power which must be surrendered to pay the debt. Together, these two effects of deflation will cause firms to fail or reduce their rate of output.

If money wages are flexible in a downward direction and fall as product prices fall, then the economy will be insulated from increases in unemployment and declining levels of output due to real wages in excess of those consistent with full employment. The anticipation of declining prices will also normally result in a leftward shift of the investment schedule and a rightward shift in the savings schedule. The nominal rate of interest would thus be expected to fall as investors and savers adjust to deflation. The decline in nominal interest rates may or may not completely offset the effect of deflation on real rates. In the new equilibrium, investment may be less, the same, or greater than before the price decline began. There is thus no reason to assume that deflation will result in economic stagnation unless wages are inflexible downward.

The years 1873-1896 in the United States were characterized by a deep secular price decline and rapid growth. Even though per capita income grew rapidly over this period, these years were marked by political and social unrest. This turmoil has served to obscure the fact that these years form a period in which national income increased at a rate equalled in few if any com- « parable periods.

The decline in prices was due to the failure of the money supply to increase as rapidly as output. This was in turn due to uncertainty regarding monetary matters. The United States was on an inconvertible paper standard until 1879, when a successful return to convertibility was made. Nevertheless monetary uncertainty continued until 1896, when world output of gold expanded rapidly and the price decline was reversed did monetary affairs cease to be a cause of friction.

Growth proceeded rapidly throughout all sectors of the economy in these years. Capital formation was also at historically high levels in these years. The farm sector grew rapidly, but not as rapidly as the entire economy. The farm sector was a source of discontent in these years even though the terms of trade turned in favor of agriculture.

interest rates also declined. Money wages exhibited downward flexibility, and generally moved in the same direction as prices. Only in the years 1833-1836 did money wages fail to move in the same direction as prices. These years coincided with great but temporary labor union successes.

Money wages declined more than enough to offset the decline in prices. For the entire periott, real wages increased less than productivity so that a redistribution of income from labor to capital occurred. This enhanced profits and must have spurred the growth of output.

Immigration was heavy in these years of deflation, and immigrants accounted for more than one-third of the increase in the labor supply in this period. This exerted downward pressure on money wages in addition to that exerted by falling prices, so that money wages during the period fell more than was necessary to offset the effects of deflation.

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Finally, a note of thanks goes to the author's wife, without whose help this would never have been completed.

Chapter 1

Introduction

The years of 1873-1896 in the United States were marked by labor strife, political agitation, and social unrest. The Greenbackers, the Populists, and the militant Knights of Labor all put their mark on the U. S. economy during these years. Although each of these groups had many complaints and made many demands which were unique to them, the complaint of economic hardship caused by declining prices, and the demand that the money supply be vigorously expanded to reverse the falling prices, formed a common bond of interest between them. Throughout these years, debate over monetary issues could be clearly heard over the strident voices discussing other issues of the day. "Free silver" and "greenbackism" were political slogans of these years. It was at the end of this period in 1896 when William Jennings Bryan, reflecting the still strong controversy over the money supply, made his famous "cross of gold" speech.

Because of the manifestations of unrest in these years, and perhaps equally as much because it was a long period of extensive deflation, this period has generally been considered a period of depressed economic activity. But we need no longer depend on verbal descriptions to assess the performance of the economy in these years. Economic growth is a quantitative concept, but only recently has enough data been assembled to permit a quantitative description of economic performance in these years. If this description lacks precision because of problems in construction estimates of changes in key economic magnitudes from the historical raw data available, it nevertheless allows a general view of the direction and of the rough magnitude of changes in economic performance to be seen.

The view of economic growth in the years 1873-1896 obtained by an examination of the data now available is completely contrary to the generally accepted view that these were largely years of economic stagnation. Instead, the data shows that these twenty-four years constituted a period of tremendous growth in output, both total and per capita.

If one accepts the view that extremely rapid economic growth is incompatible with political and social unrest, there is a dichotomy in the view of economic growth in these years presented by qualitative comment and quantitative data. On the other hand, the decline in prices reported by contemporary observers and modern historians is confirmed by price indexes covering these years. Prices fell throughout the period with the decline interrupted only by a few brief periods of increase. The price decline began in 1873 and was not permanently reversed until after 1896, and this twenty-four year period constitutes the longest secular price decline on record in U. S. history.

While prices fell, output increased at a record rate, and thus the period 1873-1896 was characterized by the unusual phenomenon of deflation accompanied by rapid economic growth. This

experience runs counter to the usual theory and belief that deflation acts as a drag on economic growth.

Debate has been vigorous over the question of the effect of a rising price level on economic growth. Some economists contend that inflation is a necessary environment for rapid growth, and that even a stable price level will inhibit growth.[1] Others contend that rapid long term economic growth requires a stable price level.[2] But there has been very little debate about the effect of a falling price level on economic growth. The contention that deflation is destructive to growth has encountered little audible opposition.

The notion that deflation is destructive to growth is an old one. This view was prevalent during the years 1873-1896. According to David Wells, one of the most respected economic observers of that day:

> Inflation results in unusual business activity. Deflation stops business. When prices are falling, every consumer and dealer soon learns that he could have done better on every purchase if he had delayed buying. This results in indefinitely putting off some purchases and in delaying buying of articles that cannot be indefinitely postponed. . . . Since everyone who produces anything or handles any commodity finds that it shrivels in his possession, and if sold often results in bad debts, business stops.[3]

Another prominent economist of that period, Jesse Orton, agreed with Wells. According to Orton, "there are few things that so effectually kill the spirit of enterprise and make capitalists timid about investing as a regime of constantly falling prices."[4] Orton was able to say this in 1895 after more than twenty years of an extremely high rate of capital formation.

This view had changed little by 1934. In that year H. G. Wells made the following observation:

> We know that it is a permanent condition of human well-being that the general level of prices should never fall. . . . A dollar, as we know it today, means practically the same thing in goods, necessities and satisfactions from one year's end to another. Its diminution in value is infinitesimal. No increase is ever allowed to occur. For the owner of an unspent dollar there is neither unearnt increment nor unmerited loss. As the productive energy of our species rises, the dollar value of the total wealth is arranged to increase steadily in proportion, and neither is the creditor enriched nor robbed of his substantial expectation nor the debtor confronted with payments beyond his powers.[5]

> But after hedging the above statements, Boulding casts caution to the winds. He says, "the facts are clear: deflation has always (italics mine) been accompanied by unemployment, slack markets, a high rate of business failure, a low rate of investment—in one word, by depression."[6]

The term deflation, which refers simply to a decline in the general price level, has come to be used interchangeably with the term depression in the vocabulary of many economists. This is remarkable today in the light of the experience of the years of 1873-1896.

Perhaps the reason for this failure even now to recognize the rapid growth with declining prices of 1873-1896 is the reluctance to even admit the possibility of such an occurrence. Because the

[1] [chart data, omitted]

[2] Fritz W. Machlup, "Constructive Suggestions for Reconciling and Simultaneously Obtaining the Three Objectives of Maximum Employment, an Adequate Rate of Growth, and Substantial Stability of the Price Level," United States Congress, Joint Economic Committee, *Employment, Growth, and Price Levels* (October, 1959), 2814-2831.

[3] D. A. Wells, *Recent Economic Changes* (New York: D. Appleton and Company, 1899), p. 428.

[4] Jesse Francis Orton, "Monetary Standards," *Journal of Political Economy*, III (June, 1895), 345-46.

[5] H. G. Wells, *The Shape of Things to Come* (New York: The Macmillan Company, 1934), p. 38.

[6] Kenneth Boulding, *Principles of Economic Policy* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1958), pp. 40, 57.

experience of these years runs counter to such strongly held and widely accepted beliefs, this period deserves closer examination than it has heretofore received. This examination will be undertaken here.

The theoretical relationship between price level changes and economic growth will be considered first, with particular emphasis on the relationships of falling prices and profits, and falling prices and capital formation. Because it has received much more attention in the literature and is the converse of the deflation-depression argument, the inflation-for-growth argument will also be examined.

After this theoretical study, an attempt will be made to ascertain the extent of growth in GNP in these years of deflation. Recent estimates of growth in this period will be compared with the available contemporary observations of growth for those years.

The reasons for the decline in prices, and the timing and magnitude of this decline will be examined next. The great uncertainty that existed during these years regarding the roles of gold and silver in the money supply was reflected in the growth of the money supply. The decline in prices was a direct result of the relationships in these years between the growth of output and the growth of the money supply.

Trends in the growth of output in broad sectors of the economy will be analyzed and compared with price changes in these sectors. An effort will be made to determine whether growth and price declines proceeded on a broad front or were confined to a few sectors of the economy.

The growth and path of prices in the farm sector of the economy will be considered in detail. Much of the unrest and dissatisfaction with economic conditions came from agriculture. In 1873, it occupied a pre-eminent position as the largest sector of the economy, but lost ground in this respect throughout the period of declining prices.

A similar analysis will then be undertaken for the industrial sector of the economy. The U. S. was transformed from an agrarian economy to an industrial state during these years of deflation. The growth of areas within the industrial sector and the corresponding price movements will be discussed.

After proceeding this far with a detailed examination of the rapid increase in output and the pervasive decline in prices, the factors which made this combination possible will be considered in the light of the economic theory discussed earlier. Attention will be focused on the movement of money wages and those factors affecting these movements, and on changes in productivity. The course of real wages and their effect on income distribution in these years will be analyzed. The effect of changes in income distribution resulting from the interaction of productivity changes and changes in real wages will also be examined in detail.

Finally, the relevance of this experience of rapid growth and a declining price level in the years 1873-1896 for the present time will be discussed. Those who maintain that rapid growth can not take place under a falling price level were incorrect for the last quarter of the nineteenth century. It does not necessarily follow that their conclusion would also be incorrect today.

Chapter 2

Deflation and Growth: Some Theoretical Considerations

There is no well-developed theory of economic growth.[1] Economic growth is a quantitative concept which has been measured in several ways, but has most often been measured in terms of changes in per capita income.

Economic growth is a complex process affected by many variables. Many of the inputs to this process, such as population growth, capital accumulation, and even technological change, can be quantified. Other important variables affecting economic growth can not. These variables may well be some of the most important ones shaping the long run course of growth. Attitudes toward equality may be such a variable. The role of the entrepreneur in promoting growth is also undoubtedly important, but the relationship is not easily defined.[2] Because of these complex and imprecise interrelationships involving many variables, an explicitly formulated theory of growth is of limited use as a device for prediction or a pattern of research.[3]

2.1 Determinants of Growth, 1873-1896

Among those factors which seem to be major determinants of economic growth, several stand out during the years 1873-1896. Population growth was rapid in those years. Studies have shown that growth in per capita income and growth in population often occur together. In fact, according to Kuznets, there is no case on record in which substantial increases in population have been accompanied by a secular decline in output per capita.[4] A growing population affects growth in a number of obvious ways, but empirical investigations have failed to ascertain the parameters describing this apparent theoretical relationship.

There does not seem to be any firm relationship between the rate of population growth and the rate of increase[5] in per capita income.

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[1]Simon Kuznets, *Economic Growth and Structure* (New York: W. W. Norton and Company, Inc., 1965), p. 4.

[2]W. Paul Strassman, "Economic Growth and Income Distribution." *Quarterly Journal of Economics*. LXX (August, 1956), 427.

[3]Kenneth E. Boulding, Economic Analysis, Vol. II: Macroeconomics (4th ed.; New York: Harper and Row, 1966), p. 227. Also Kuznets, op. cit., p. 5.

[4]Kuznets, op. cit., p. 123.

[5]Gallman found that the chief source of increased commodity output in the U. S. in the last half of the nineteenth century was an increased labor supply. See Robert E. Gallman, "Commodity Output, 1839-1899," in Trends in the

It is clear that the growth of big businesses able to achieve economies of scale was also an important factor affecting economic growth in these years. It was during this period that the great transformation of the U. S. from an agrarian to an industrial economy took place. At the same time, giant business enterprises entered the scene. Many of these giants were the results of mergers, especially those which appeared after 1866. Unfortunately, little is known about the particular nature of individual mergers which occurred at that time.

Mutual interactions between economies of scale and increases in per capita income exist. The specific nature of these links, though, is not known. It is unclear to what extent economies of scale promote rapid growth, and to what extent they are promoted by rapid growth. Speaking of the period covering the last thirty years of the nineteenth century and the formation of large business units, Davis, Hughes, and McDougall say,

> Our great industrial transformation was precisely the period in which the giant business units made their decisive entry into American economic history. . . . Unfortunately, we are still ignorant of most of the concrete facts regarding this great transformation. All we know, and this only in a very general way, is that the scale of American industrial organization expanded to match the great transformation in the scale of the American industrial economy.[6]

Technological change is another important factor underlying economic growth. Through improvements in technology, an economy may escape the limits which would otherwise be placed on the growth of output by its ability to supply labor and accumulate capital.

In many cases, improvements in technology have made large scale business operations possible. The ability to achieve economies of scale may thus depend in large measure on the rate of technological change.

According to Nutter, improvement in technology ranks with capital accumulation as one of the two major forces affecting economic growth.[7] Weber and Handfield-Jones attribute the rapid growth of the economy from 1870 to 1900 largely to cost-reducing improvements in technology But in spite of the major role in growth which it plays, we know very little about what[8] circumstances favor technical change.

2.1.1 Capital Accumulation

Sustained rapid economic growth depends in large part on a sustained high level of capital accumulation. Additions to the existing stock of capital increase the productive capacity of the economy and increase the productivity of the labor force if the amount of capital per worker increases. It can be seen from this that the way a growing population affects economic growth depends partly on the rate of capital accumulation in the economy.

The rate of capital accumulation also influences the pattern of output, which in turn influences the rate at which income per capita will grow. If capital accumulates rapidly enough relative to the increase in other factors of production, then it may become cheaper relative to these other factors

American Economy in the Nineteenth Century, Vol. 24, Studies in Income and Wealth (Princeton: Princeton University Press, 1960), p. 34. Keynes found that a growing labor force possesses greater mobility than a declining or stationary population. See John Maynard Keynes, "Some Economic Consequences of a Declining Population," Eugenics Review. XXIX (April, 1937), 13-17.

[6]Kuznets, op. cit., p. 124.

[7]Jesse W. Markham, "Survey of the Evidence and Findings on Mergers," in Business Concentration and Price Policy (Princeton: Princeton University Press, 1953), pp. 141-82.

[8]Lance E. Davis, J. R. T. Hughes, and Duncan McDougall, American Economic History (Homewood, Illinois Richard D. Irwin, Inc., 1961), p. 267.

(whether this in fact occurs will also depend on the relative demands for the various factors of production). This will increase the production of capital intensive goods relative to the production of other goods. Capital-intensive goods are in general more subject to decreasing real costs as output is increased, or in other words, economies of scale are more likely to be realized in the output of capital-intensive goods than, for example, labor-intensive goods. Therefore, more rapid growth will be generated in the economy as a result of the shift toward capital-intensive goods.

Estimates of gross and net capital formation, in total and by broad category of use, are available[9] for the United States beginning in 1870. According to Kuznets, the maximum proportion of national product that can be devoted to gross capital formation seems to be 25 percent. Gross capital formation in relation to national product seems to have been close to this maximum figure throughout the period 1873-1896. But there is no simple direct relationship between the rate of increase in capital formation or the proportion of total output devoted to capital formation and the rate of growth of output. At least up to a certain point, a more rapid rate of capital accumulation will mean a more rapid rate of growth, but the increases may not be proportional.

2.2 Economic Growth and the Price Level Inflation and Growth

Much has been written concerning the effect of changes in the level of prices on the rate of growth, but no concensus on this question has been reached by economists. This question is, of course, central to our analysis of the relationship between growth and deflation during the period 1873-1896, for again the problem here is not to ascertain whether growth can occur in the presence of deflation, but whether growth would have been more or less rapid in its absence.

Price level changes are seen as influencing the rate of growth in two interrelated ways; first, through their effect on the rate of capital accumulation; and second, through their effect on the incentives of producers to increase or decrease rates of production, which will in turn influence the rate of capital accumulation.

It has been widely argued that inflation, or a rising price level, will act as a stimulus to growth in developing countries. The argument which regards deflation as a drag on growth has been explicitly stated separately, but it is usually presented as a corollary to the inflation-for-growth argument, and can be most easily understood as essentially the reverse of that argument.

Underlying the idea that inflation stimulates growth in developing countries is the premise that more rapid accumulation of capital will result in more rapid economic growth. Voluntary savings are likely to place a limit on capital formation that is not high enough for a satisfactory rate of growth. It is argued that inflation will result in voluntary savings being augmented by "forced savings," so that the desired rate of capital accumulation can be achieved. The process goes something like this: the desired amount of investment is financed by an expansion of bank credit; this expansion of bank credit causes prices to go up; consumers then find that the purchasing power of their income has declined. Consumers have been "forced" to save. In this way, real income is transferred from consumers to investors.

A second result of inflation it is argued, closely akin to the above, is an increase in profit margins. As prices go up, profits will expand. This increase in profits provides not only an incentive for additional investment, but also a way to finance that investment without having to rely on continued expansion of bank credit. This enables the new and higher rate of investment to be sustained over time.

[9]G. Warren Nutter, "On Measuring Economic Growth," *Journal of Political Economy*. LXV (February, 1957), 51-63.

Implicit in this analysis, but not usually spelled out specifically, is the assumption that one price, the price of labor, or wage rate, does not increase, or at least does not increase in the same proportion or as rapidly, as prices in commodity markets.[10] This failure of wages to keep up with increases in the marginal productivity of labor in turn assumes that there is some flaw in the labor market, such as imperfect upward flexibility in wages due to the existence of labor contracts of fairly long duration. The worker can only hope to catch up with price increases by adjusting his wage upward at the times when the contract is to be renegotiated, always falling behind in real income during the intervals between.

It is this failure of wages to keep up with other prices that increases the profit margins of sellers. If this wage lag were to be eliminated, then all costs would rise in the same proportion as prices of finished goods. All relative prices would be unchanged. The source of increasing profits would be eliminated, and with it the incentive for greater investment as well as the source of the greater investment.

Samuelson and Solow trace the inflation-forgrowth argument as far back as David Hume. According to them, Hume recognized that, "The periods of rising prices seemed to give rise to at least transient stimulus to the economy as active profit seekers gained an advantage at the expense of the more inert fixed-income,[11] creditor, and wage sectors."

Kaldor credits Sir Dennis Robertson with being one of the first to have perceived that inflation will stimulate growth. Kaldor credits Robertson with originating the idea of stimulating growth through a "gently[12] rising price level."

In his treatise Money, first published in 1922, Robertson refers to inflation as a spur encouraging businessmen to expand investment and output through its effects on profits. Indeed, Robertson states that inflation may have been vital to economic development. He asks, "Would the railways or the electrical plants of the world ever have been built if we had been afraid[13] of a little forced saving?" He further states,

> So long as the control of production is in the hands of a minority, rewarded by means of a fluctuating profit, it is not impossible that a gently rising price-level will in fact produce the best attainable results, not only for them but for the community as a whole.[14]

A more recent outspoken advocate of the use of inflation as a spur to growth is Earl J. Hamilton.[15] Hamilton, like Robertson, believes that a mild rate of inflation in the neighborhood of 1 to 2 percent per year would enable an economy to grow faster than if prices were stable. Hamilton's "profit inflation" thesis is thus one of the two principle arguments for inflation discussed above. But Hamilton's argument is more than theoretical. He supports his idea by examining historical data which he claims show that periods when profits were augmented by inflation were also periods of the most rapid economic growth.

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[10] B. Weber and S. J. Handfield-Jones, "Variations in the Rate of Economic Growth in the U.S.A., 1869-1939," Oxford Economic Papers. New Series, VI (June, 1954), 101-31.

[11] Nutter, op. cit.

[12] See Simon Kuznets, *Capital in the American Economy*: Its Formation and Financing (Princeton: Princeton University Press, 1961).

[13] E. M. Bernstein and I. G. Patel, "Inflation in Relation to Economic Development," International Monetary Fund Staff Papers. II (November, 1952), 363-98.

[14] Paul A. Samuelson and Robert M. Solow, "Analytical Aspects of Anti-Inflation Policy," *American Economic Review*. XL (May, 1960), 170.

[15] Nicholas Kaldor, "Economic Growth and the Problem of Inflation," Part II, Economica (November, 1959), 290.

Nicholas Kaldor's argument that inflation is necessary for rapid growth is slightly different from those discussed above, although it contains all of the[16] essential points already mentioned. ■ It will be discussed in detail here because it is more explicitly formulated than most other statements of the case for inflation, and because Kaldor introduces an important element omitted by most others, an element which is crucial to the relationship of deflation and growth.

Kaldor's views on inflation and growth stem from a growth model that he formulates. At the foundation of this model is a concept which Kaldor terms[17] "the technical dynamism" of an economy. This technical dynamism is the relationship that exists between the rate of change of output and the rate of accumulation of capital. Kaldor uses this concept as a replacement for the traditional idea underlying the production function, the relationship between the stock of capital and output per period.

He argues that it is useless to analyze a production function in which technology is taken as given, and then to show a continual upward shift in the production function over time. Instead, capital accumulation and technological change occur simultaneously and can't be separated from each other. When the state of knowledge is not taken as given, we need not get diminishing returns. The relationship between capital and output can be such that the marginal product of capital need be no smaller than the average product, and may perhaps be larger. This causes Kaldor to reject the marginal productivity theory of factor prices. Thus, "it is more sensible to take as given, not the relationship between capital stock and output. . . but the relationship between the rate of accumulation and the rate of change of output."[18] Figure 1 shows how the technical progress function enters into Kaldor's analysis.

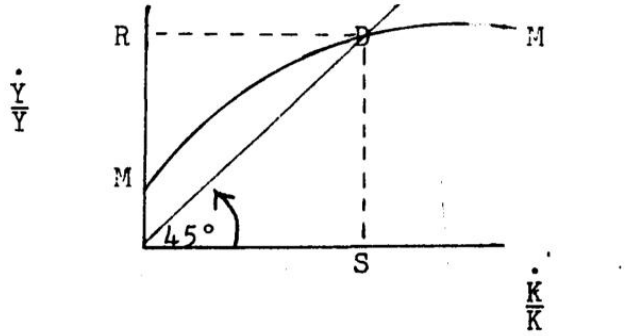

Figure 1

Plotted along the X axis is the percentage growth rate of capital per capita, and along the Y axis is the percentage growth rate of income per capita. MM is the technical progress ■ - function, which exhibits diminishing returns. According to Kaldor, a capitalist economy will adjust to a steady rate of increase in per capita income of R percent, and an equal rate of increase in capital per capita of S percent. At this point, the rate of profit on investment will neither be diminishing nor increasing.[19] This explains, he claims, the historic constancy of the share in income of wages and profits, and why an economy can continue to grow without showing a tendency for diminishing returns to set

[16]D. H. Robertson, Money (New York: Harcourt, Brace and Company, 1929), p. 149.

[17]Ibid., p. 150.

[18]See Earl J. Hamilton, "Prices as a Factor in Business Growth," *Journal of Economic History*. XII (No. 4), 1952, 325-49; and "Profit Inflation and the Industrial Revolution," *Quarterly Journal of Economics*. XLVI (February, 1942), 256-73.

[19]Nicholas Kaldor, "Economic Growth and the Problem of Inflation," Part I and Part II, Economica, XXVI (August and November, 1959), 212-26 and 287-98.

in. Finally, the shape of the technical progress functionexplains why some economies grow at a faster or slower rate than others.

Kaldor makes the assumption that business investment is financed entirely out of profits, an assumption which he asserts is fairly realistic. He further assumes that the economy has reached its equilibrium point D so that it isgrowing at a steady rate, and that distributive shares are constant. Finally, he assumes that the proportion of profits devoted to investment is constant.

Having made these assumptions, Kaldor asks,

> Is there nothing in the notion of a productiv-ity-rate of interest, determined by real forces, and which governs the demand schedule for invest-able funds, as distinct from the monetary and psychological factors which govern the supply schedule? * His answer is yes, there is a productivity rate of interest. It is found in the dependence of the rate of profit on the rate of growth. This proposition is arrived at as follows, and the following notation is used:

capital per capita Since all investment comes from saving out of profits, we have At the equilibrium rate of growth, we have (3) 4 s - G^{20} <K. is constant so the rate of profit, £ , depends on the rate of growth.

We can further manipulate (1) so that This shows that the marginal efficiency of capital depends on how fast profits are growing. Profits and the rate of profit in turn depend on how fast the economy grows.

In the type of economy described by Kaldor, where distributive shares remain constant, profits will grow at the same rate as per capita income. Since profits are the major source of investment, a sustained high rate of growth can be maintained only if the economy has been growing rapidly in the first place. But this paradox is easily explained, and it is here that Kaldor introduces the idea of inflation as a stimulus to growth.

Investors in a capitalist economy respond to the incentives of monetary reward. The marginal efficiency of capital, which according to (5) depends on the growth of profits, together with the rate of interest will determine investment. Now the gross return on capital must be high enough to cover the cost of capital, a return for risk, a return for illiquidity, and an excess margin sufficient to induce investment out of borrowed funds, since profits have not been high enough to provide adequate funds for capital formation.

Because the rate of interest can't be driven down to zero, a minimum cost of capital exists which is relatively high. According to Kaldor, this floor on the cost of capital means that a gross return on capital as high as 12 percent may be necessary to induce the desired investment Investment opportunities that afford such nominal rates of return may be rare. But even if the nominal or moeny rate of return on capital is not high enough to induce adequate investment, the real rate of return, the return in terms of actual purchasing power, may be.

A divergence between the nominal and real rate of return on capital can be created by a changing price level. A rising price level, pr depreciation of money, creates a negative real rate of interest as long as the rising price level is unanticipated. The nominal rate of interest is the rate at which the loan must be repaid in dollars. The real rate of interest is the price of the loan in real terms of purchasing power surrendered. During inflation, money is borrowed[21] in one period when its purchasing power is high, and repaid in another period when its purchasing power has declined. If prices increase rapidly enough, the purchasing power repaid may be less than that borrowed. In this case, the real rate of interest is negative.

[20] Kaldor, Part I, op. cit., 222.

[21] Ibid.

If the real rate of interest is negative, or, what is the same thing, if the real d:ost of capital becomes negative, the real return on investment may reach the required level, even though the nominal rate remains unchanged. It is the role of inflation to create a negative rate of interest sufficient to produce the required real return on capital. And the role Kaldor assigns to inflation is crucial, for only in rapidly growing economies will a stable price level permit growth. Kaldor states, "If this is correct, a regime of completely stable prices is only consistent with a steadily growing economy when the real rate of growth in the national income is fairly high—when it exceeds 4-6 percent per annum." And,

> If follows that price stability is only consistent with steady growth when the rate of growth of productivity and/or of the working population is sufficiently large to give a relatively high rate of growth to the total national product. '

Kaldor concludes that initially most countries will need inflation to stimulate growth. Once they have achieved a rapid economic growth, however, there will be no need to continue the inflation, for rapid growth becomes self-sustaining.[22] Although Kaldor recognizes the effect of inflation on profits and forced saving, his analysis is different from the others that have been discussed in its emphasis on this point. It will be seen below that the relationship between a changing price level and the real rate of interest is one of the most important[23] aspects that must be considered in attempting to ascertain the relationship between growth and deflation.

Before briefly considering the validity of these theories that have just been discussed, one other argument stating that inflation is an inescapable cost of a satisfactory rate of growth should be touched on. The previous arguments have applied in general to developing economies, but this one applies to most contemporary[24] economies, both developed and underdeveloped. It does not seem to apply to the American economy in the nineteenth century. It is a separate and unrelated argument and should be distinguished from the others that have been set forth here. Although it has little relevance for this paper, it is included here because many people fail to recognize its nature, and link it with the other inflation-for-growth arguments.

Sumner Slichter, Kenneth Boulding, and others have argued that inflation is necessary for growth, not just because inflation promotes forced savings or increases profits, but also because in the absence of inflation, labor-management relation[25] may worsen, resulting in labor unrest, unemployment, and stagnation[26] in growth.

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[22] [23]The rate of profit, or the return on capital, is $\frac{Y}{K}$, and the percentage rate of growth of profits is $\frac{\dot{Y}}{Y} - \frac{\dot{K}}{K}$. If $\frac{\dot{Y}}{Y} = \frac{\dot{K}}{K}$, then $\frac{\dot{Y}}{\dot{K}} = \frac{Y}{K}$, and rate of profit in the economy will be unchanged from period to period. If $\frac{\dot{Y}}{Y} > \frac{\dot{K}}{K}$, then $\frac{\dot{Y}}{\dot{K}} > \frac{Y}{K}$, and the rate of profit will be increasing. Similarly, if $\frac{\dot{Y}}{Y} < \frac{\dot{K}}{K}$, then $\frac{\dot{Y}}{\dot{K}} < \frac{Y}{K}$, and the rate of profit will be diminishing.

[23]Kaldor, Part I, op. cit., 224.

[24]Kaldor, Part II, op. cit., 289.

[25]Ibid., 232.

[26]See Sumner H. Slichter, op. cit., 53-57, and Boulding, *Principles of Economic Policy*, op. cit.

The late Sumner Slichter declared that, "Of late years, there have been changes in the economy that create a strong likelihood that economic expansion will be accompanied by rising labor costs and prices."2[27] Boulding stated that,

> It may well be that the cost of the high degree of organization of society, not only in the labor movement but in many other aspects of life, is that the economy cannot run without continued inflation. Industrial relations are certainly much easier to manage in a period of gentle inflation, when money wages are rising.

This reasoning is based on the belief that strong unions will not be content without periodic substantial wage increases resulting in greater labor costs. These increased labor costs will result in unemployment unless the money supply is increased by monetary authorities so that firms may offset increased costs with higher prices.

Let us now consider some criticisms of the inflation-for-growth theories. It would seem that the question concerning the validity of these theories would be an empirical one which could be answered by empirical investigations. Such has not been the case. The few empirical investigations which have been made dealing with this question generally have been inconclusive. If anything, they support the contention that a stable price level provides a more friendly environment for economic growth than that provided by inflation.-^ There are other reasons for believing that inflation may at best be neutral in its effect on economic growth. Kessel and Alchian have cast doubt on the wage-lag hypothesis, which as we have seen is an essential element of the forced-saving and increased[28] profit argument for inflation. According to Kessel and Alchian, the existence of a wage;lag would be most likely in an economy where labor contracts for substantial periods are made. But this is also where escalator clauses which adjust wages upward for increases in the price level are also likely to be found.

They examine other possible arguments supporting the wage-lage hypothesis and find only one likely to be valid.[29] This is the argument that employers gain during inflation not because of an imperfection in the labor market, but because a debtor-creditor relation exists between employer and employee; wages are paid after they are earned. During inflation, debtors gain at the expense of creditors because they repay their loans in depreciated dollars. Even though this may occur, Kessel and Alchian feel that the magnitudes involved are so small that very little, income could be[30] transferred from employee to employer. After examining the arguments supporting the wage-lag contention, Kessel and Alchian conclude that,

> In general it appears that unwarranted validity has been assigned to the wage-lag hypothesis, given the character of the evidence that has been used to support it. A rereading of this evidence suggest that the wage-lage hypothesis ought to be regarded as essentially untested. ^

Kaldor, whose advocacy of inflation for growth does not depend on the existence of a wage lag, has implicitly rejected this notion. He feels that an effort to hold down money wages even in a

[27]Sumner H. Slichter, "The American Economy: Problems and Prospects," United States Congress, Joint Economic Committee, *Employment, Growth, and Price Levels* (October, 1959), pp. 2-13.

[28]Boulding, *Principles of Economic Policy*, pp. 154-55.

[29]See, for example, Howard S. Ellis, "Price Stability: The Conflict Between Growth and Control of Inflation," in Kenneth Berrill (ed.) Economic Development With Special Reference to East Asia (New York: St. Martin's Press, Inc., 1964); Federal Reserve Bank of New York, "Inflation and Economic Development," Monthly Review. (August, 1959), 122-27; U. Tun Wai, "The Relation Between Inflation and Economic Development," International Monetary Fund Staff Papers. VII (October, 1959), 203-17; and, Rattan J. Bhatia, "Inflation, Deflation, and Economic Development," International Monetary Fund Staff Papers. VIII (November, 19^0).

[30]R. A. Kessel and A. A. Alchian, "The Meaning and Validity of the Inflation-Induced Lag of Wages Behind Prices," *American Economic Review*, L (May, 1960), 43-66.

period of stable prices would be utopian if increases in productivity were occurring so that profits were increasing.[31] It will be recalled that Hamilton relied heavily on the wage-lag hypothesis in his own analysis of the historical role of profit inflation in accelerating the rate of growth. Felix has criticized Hamilton's conclusion. Felix contends that Hamilton has not shown the existence of profit inflation. Felix reviews the cases of inflation analyzed by Hamilton. By disaggregating, Felix shows that the sectors of the economy which were growing fastest generally were not the ones responsible for the inflation, and the sectors undergoing inflation did not seem to be enjoying increased profits and prosperity.[32] If Felix is valid in his criticism, it follows that Hamilton's observations of the wage-lag are also incorrect. Concerning the general issue of inflation and its effect on growth, Felix concludes saying,

> By indicating no clear correlation between inflation, or its absence, and variations in the rate of economic growth, the data suggest that the long-run inclination of the-price level may have only a relatively minor influence on growth rates.3°

None of the specific criticisms of the inflation for forced-saving and increased-profit doctrine apply to the Kaldor inflation hypothesis, although the doubts cast on the idea that the rate of growth and inflation in general are positively related do apply. Kaldor's growth model may be criticized on the grounds of its assumptions and the loose construct of the technical progress function, but that is beyond the scope of the present analysis. Kaldor's contention that an increase in the price level might reduce the real rate of interest and even make it negative is correct. What may or may not be correct is his belief that in a weakly growing economy the real rate of interest will likely have to be driven downward by inflation so that the prospective return on capital will be great enough to induce adequate investment. Nevertheless, it can be shown that a rising price level will, ceteris paribus, increase the marginal efficiency of capital. The relationship between the rate of change in prices and the MEC will be explained in detail below, but for the present this relationship will[33] be assumed. Thus, for any given nominal rate of interest r, investment will be greater in the presence of inflation than in the presence of stable prices. This is shown in Figure 2.

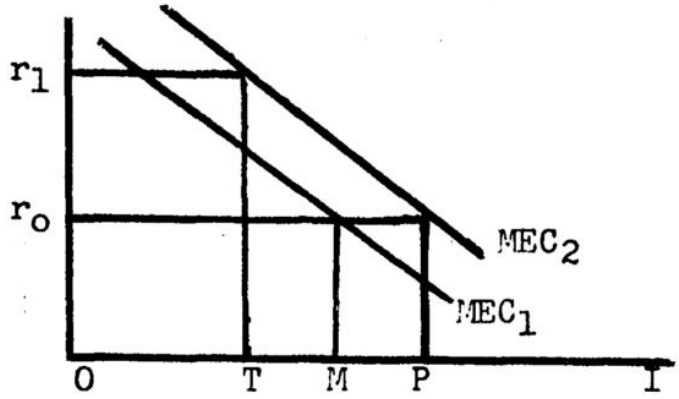


Figure 2.

[31]Ibid., 46.
[32]Ibid., 64.
[33]Kaldor, Part II, op. cit., 290.

The nominal rate of return r,o[34] is plotted on the Y axis and investment on the X axis. MEC[35] is the marginal efficiency of capital with stable prices. Inflation causes this to shift to MEC2. The nominal rate of interest is rQ, so that investment under stable.prices is OM and with a given rate of inflation it will be OP. Inflation causes an increase in investment of MP units. This increased rate of investment will likely mean that the rate of growth will also increase.

If this analysis is correct, inflation will stimulate economic growth even if a wage lag, profit inflation, and forced saving do not occur. If there is no evidence that inflation has resulted in more rapid economic growth, it is probable that this analysis is not correct because the assumption of ceteris paribus does not hold true. Other variables can change, and indeed it would be highly improbable if they did not change in the presence of inflation.

One variable that would be likely to change in the presence of inflation is the nominal rate of interest. Inflation is a tax on cash balances and thus reduces the incentive to save. The supply of savings is therefore reduced at the same time that the demand for savings increases. This would result in an increase in the nominal interest rate. And it is an observed fact that nominal interest rates, which are the prices of loans of money, rise just as other prices in periods of inflation.

This increase in the nominal interest rate may be great enough to offset the increase in the marginal efficiency of capital. In terms of Figure 2, this would be shown as a rise in the nominal rate of interest from ro to r[36]. Inflation has now caused a net decline in investment of TM units. This would be harmful to the long-run rate of economic growth, and may help explain findings like that of Bhatia, that stable prices seem to be more conductive to growth than increasing prices.

There are also other effects generated by inflation which may be inimical to economic growth.

Bernstein and Patel, and the Federal Reserve Bank of New York present detailed discussion of these effects.[37]

2.2.1 Deflation and Economic Growth

There seems to be a general lack of evidence to support the claim that inflation acts as a spur to economic growth. What scanty evidence does exist suggests that it may in fact be harmful to rapid growth. This can not legitimately be used to infer that deflation, the reverse of inflation, is not a drag on growth. As we shall see, even though the arguments used to show the detrimental effects of deflation are largely the opposite of those used to support the inflation-growth hypothesis, important asymmetries may exist in the two cases.

> It is possible that a price-level continually falling, even for the best of reasons, would prove deficient in those stimuli upon which modern society, whether wisely or not, has hitherto chiefly relied for keeping its members in full employment and getting its work done.[38]-1

Robertson's view of deflation as harmful applies to a "modern society." Unfortunately, he does not spell out what this means.

Kaldor says, "a policy of stable incomes and falling prices. . . is not consistent with growth at all: not unless the population increased so rapidly that aggregate incomes grew at the required

[34] Ibid., 444.

[35] Ibid., 463.

[36] The relationship between the nominal rate of interest, the rate of change in prices, and the real rate of interest is shown in footnote 57. For any nominal rate of interest, a given rate of inflation will lower the real rate of interest, and thus increase investment, in effect shifting the MEC schedule to the right.

[37] Bernstein and Patel, op. cit. and Federal Reserve Bank of New York, op. cit.

[38] Robertson, op. cit., 149.

minimum rate, despite the fact that incomes per head were con-^ stant." This is a circumstance which Kaldor thinks is unlikely to occur. Kaldor's view on deflation, too, stems from his belief that inflation boosts growth by decreasing the real rate of interest, which in turn stimulates the rate of investment. While it is not stated explicitly by him, it follows that a declining price level would raise the real rate of interest and thus discourage investment. This question is a crucial one, and it will be considered in detail below.

Boulding states the case against deflation in greater detail.[39] Deflation will result in economic stagnation because it discourages investment. According to Boulding it does this through its effects on profits. When prices are falling, raw materials and other inputs are purchased in one period at a higher price and the final product sold in a later one when prices are lower. It is this decline in prices over the period between production and sale that will reduce profit margins.

Warren and Pearson also emphasize this point.[40] A steady decline in prices will result in "a perpetual hidden loss on inventories."[41] The decline in profits will be greater the longer this interval because the greater will be the decline in prices.

The decline in profits will cause firms which were at the margin to fail. Those firms which do not fail will reduce their output and cut back on employment. Investment will no longer be as profitable as before prices began to fall, and so investment will be reduced. Deflation will in this way, by reducing profits, induce a decline in the rate of output, employment, and investment. In fact, if the deflation is bad enough, instead of just a reduction in the rate of growth, depression will occur. Boulding and Warren and Pearson believe that it is highly probable that deflation will produce depression.[42] We meet again with the assumption that wages lag behind movements in the price level. Boulding makes this assumption explicitly in at least one instance, but is vague about the reason for the decline in profits in another.[43] Warren and Pearson make their belief in the existence of a wage lag clear, but do not clearly relate it to the decline in profits caused by deflation.[44] One other possible source of a temporary reduction in profits not mentioned specifically in this regard by Warren and Pearson or Boulding is the increase in the real burden of previously incurred debt. This previously incurred debt is fixed in money terms, and as prices fall, the debt increases in terms of real resources given up in repayment. Taussig indicated that one of the chief complaints heard during the period 1873-1896 concerned the alleged increased real burden of the debt. He felt that this was largely unjustified because it was offset by increases in productivity.[45] Even if increases in productivity are not sufficient to offset Boulding is clear about this wage lag in Macroeconomics, on. cit., but vague in Principles of Economic Policy, o p. cit.

the increased real burden of debt, once prices start to decline, firms and other debtors will take the increased real rate of interest into account and adjust their future borrowing to it so that it will not continue to be a source of reduced profits.

This assumption of downward wage inflexibility is then a crucial one. For if all prices, including wages, decline in proportion, profits will be reduced in money terms only. Producers will receive a lower dollar amount for their output when it is sold than the dollar costs they incurred in producing

[39]Kaldor, Part II, op. cit., 282.

[40]Boulding, *Principles of Economic Policy*, op. pit. , pp. 57-59.

[41]G. F. Warren and F. A. Pearson, Gold and Prices (New York: John Wiley and Sons, Inc., 1935), pp. 274, 312.

[42]Ibid., p. 274.

[43]Boulding, *Principles of Economic Policy*, p. 57; and Warren and Pearson, op. cit., p. 428.

[44]Warren and Pearson, op. cit., p. 428.

[45]Frank W. Taussig, The Silver Situation in the United States (2nd ed.; New York: G. P. Putnam's Sons, 1896), pp. 97, 101.

the output, but this is the wrong comparison to make. The proper comparison is the one between prices received for the sale of output and the prices at which new inputs must be purchased. This ratio will not change if wages are flexible downward so that all prices fall together. Downward wage flexibility provides a safeguard against a decline in profits due to a fall in prices during the interval after costs are incurred and before the final sale of the output.

It can be easily shown that under certain circumstances deflation will not reduce even money profits even though wages exhibit no downward flexibility. Indeed, an anticipated decline in prices may not reduce profits even though wages actually increase. All that is necessary is that money wages and real debt on previous loans increase by a smaller relative amount than productivity. This can be shown by a simple hypothetical example. It is assumed that borrowers and lenders have adjusted to the new real rate of interest so that no increase in real indebtedness occurs here.

Period[46] Output Total (units) Price Revenue Wages Profits 100 $1 $100 $90 $10 Period 2 110 $.[47] $104.[48] $94.[49] $10.[50] In this example there are only two distributive shares, wages and profits, and employment is held constant. In period 1 the wages share of total revenue is 90 percent, and the profits share is 10 percent. In period 2 productivity has increased by 10 percent, and the unit price has fallen 5 percent. Money wages have increased by 4.[51] percent, or less than the increase in productivity. Even though money wages have increased and the price per unit fallen, money profits have also increased by 4*5 percent, the same as the increase in money wages, so that the relative share of profits has also remained constant.

2.3 The Classical Theory

Of course increases in productivity will not always offset the combined effects of a declining price level and an increasing or even constant wage level. But even if they don't we have seen that downward wage flexibility will act to offset the harmful effect on output and employment of adeclining price level. This was the mechanism bywhich theClassical Theory of employment and output, as stated by Wicksell, assured full employment in the presence of shocks to the system.[52] The following partial representation of the classical system is taken from Ackley.[53] The savings and investment functions have been omitted here but will be considered later.

-®*See Knut Wicksell, Lectures on Political Economy, Vol. II, trans. L. Robbins* (*London: Houtledge and Kegan Paul, 1955*) W = Money wage rate P = Price level k = fraction of income held in cash (Cambridge k) Let us assume an initial position of full employment in the economy. In addition,

[46]For an excellent discussion of these growth models see Gardner Ackley, Macroeconomic Theory (New York: The Macmillan Company, 1961), p. 157.

[47]For an excellent discussion of the effects of wage flexibility in this case see Rendigs Fels, American Business Cycles—1869-1897 (Chapel Hill: The University of North Carolina Press, 1959), pp. 47-52.

[48]Hamilton, "Prices As a Factor in Business Growth," op. cit., 327.

[49]John Maynard Keynes, The General Theory of Employment, Interest and Money (New York: Harcourt, Brace and World, Inc.), p. 254.

[50]Boulding, Macroeconomics, op. cit., p. 64.

[51]For an excellent discussion of deficient aggregate demand in the presence of flexible prices and wages see Ackley, Macroeconomic Theory, op. cit., Chapter XIV.

[52]Keynes, The General Theory, op. cit., Chapter 15.

[53]Patinkin has shown that if prices and wages are allowed to fall far enough, the inconsistencies existing between savings and investment will be removed through forces exerted by the real balance effect. See Don Patinkin, "Price Flexibility and Full Employment," in Friedrich A. Lutz and Lloyd W. Mints (ed.) *Readings in Monetary Theory* (Homewood, Illinois: Richard D. Irwin, Inc., 1951), pp. 252-2S3.

let us assume wages are fully flexible downward. What will happen to output and employment in this system when the price level falls?

As a note of caution it should again be emphasized that we are not specifically concerned with the Classical-Keynesian issue concerning the ability of wage flexibility to maintain full employment in spite 52 of autonomous downward shifts in demand or investment. It will be shown in Chapter III that the general decline in prices from 1873 to 1896 was due mainly to the failure of the money supply to expand as rapidly as output. It may be that such a decline in prices will induce a downward shift in demand or investment. As we shall see, this possibility was ruled out by assumption in the classical model. It will shortly be discussed as a factor that may modify the results of the classical model.

Equation (4) is a representation of the quantity theory. Let us suppose that the price level is reduced by half due to a reduction in the money supply.

The first effect will be to create pressures tending toward a reduction in employment. This can be seen from (2) which states the profit maximizing conditions that the real wage will equal the marginal product of labor. The effect of a reduction by half in the price level on the real wage can be seen by rewriting (2) as follows:

(2)-a = W_- The reduction in the price level has initially increased the real wage. Unemployment will be created as firms reduce employment to increase the marginal product of labor to equal the new real wage. But with wages completely flexible downward, this attempt to reduce employment will cause money wages to fall. Money wages will continue to fall until they have been reduced by half, for at this point the real wage will again equal the marginal product of labor at full employment. Equation (2) becomes This reduces to our original equation W We see that (1) and (2) are unchanged by the decline in prices. Full downward flexibility of wages has completely insulated output and employment from any reduction in the price level.

But this might seem to prove too much. We have already reached the conclusion that downward wage flexibility will prevent any reduction in profits due to a decline in prices after costs of production are incurred and before the final output is sold. But this is not the only possible source of loss. One other source must be considered.

A declining price level will mean, ceteris paribus, that the interest cost on debt already incurred will be higher than with a stable price level. Debt incurred in periods of higher prices and repaid in succeeding periods when prices are falling will therefore impose a greater real burden on debtors, and it is generally assumed that firms are net debtors. Declining prices impose greater costs on firms by adding to the real burden of the debt. Is it not true, then, that real wages could not remain constant, but must fall to make up for the increased real burden of debt if employment and output are not to fall?

The answer is no. One of the assumptions of the classical model is that money is not desired for itself, but only as a medium of exchange. For every debtor, including firms, whose real indebtedness has increased because of the decline in prices, there exists a creditor who receives a windfall gain that exactly offsets the losses of debtors. These creditors will spend their windfall gains in the market, and this additional expenditure will exactly offset the effect of the increased real burden of the debt. Our original conclusion that employment and output are un-^ affected by deflation as long as wages are flexible downward holds.

How likely is it that this classical model will hold true? Consider first the critical assumption of downward wage flexibility. Without this flexibility, the classical model shows that unemployment and a decline in output will result from deflation. When we discussed the question of the relation-

ship between inflation and growth we concluded that there was no reason to assume that wages lagged behind as prices rose.

To say that wages are flexible upward is not to conclude that wages are therefore flexible downward. That is a different question altogether. Hamilton may have been wrong when he assumed that wages lagged behind prices as prices rose, but he may have been correct when he said, "A tendency for wages to lag behind falling prices has inflicted losses on businessmen, discouraged saving and investment, and aggravated commercial crises."3 Keynes attributed the trait of money illusion to workers, and felt that this would cause workers vigorously to resist downward adjustments in money wages. The question of whether the plassical assumption of downward wage flexibility is valid is an em-^ pirical one. An examination of the present-day American economy where key wage patterns are determined by strong unions bargaining with strong(companies can only lead one to conclude very definitely that wages are not flexible downward. But the classical theory was not formulated by economists observing the present-day American economy. Nor need conditions in the present-day American economy characterize the American economy during the years from 1873 to 1896. The classical assumption of downward wage flexibility may well have characterized those economies observed by the classical economists, and it may have also characterized the American economy during the period 1873-1896. In the main it is observations of our modern economy that have led many economists to reject the classical model. Boulding recognized this when he declared:

> Where labor and commodity markets are highly organized, where collective bargaining is the rule, and where workers offer strong resistance to reductions in money wages, the Keynesian model is more plausible; where all markets are competitive and money prices and wages highly flexible, the classical model may be closer to reality. In most modern societies there has been a strong tendency for money prices and wages to become more rigid, especially in resisting downward movements, and it is this more than anything which has made the Keynesian system more attractive.

The question of whether the classical assumption of downward wage flexibility applies to the period 1873-1896 can best be resolved by an examination of wages in that period. It will be argued later that such an examination indicates that wages did exhibit downward flexibility through at least a substantial part of the period.

Consider now the assumption that money is demanded only as a medium of exchange and not as an asset. If this assumption is incorrect, the windfall gains to creditors may be partly or completely saved so that they do not cancel the increased real indebtedness of borrowers. This occurrence can not be ruled out: expectations of falling prices increase the incentives to hold cash balances and reduce the incentives to spend them. The expected purchasing power of cash balances held increases in proportion to the expected decline in prices.

If the decline in expenditure caused by the increased real indebtedness of firms is not fully offset because of failure of aggregate expenditure to be in-^ creased by part or all of the windfall gain of creditors, some firms may fail and, in any case, employment and output will initially tend to be reduced because the real wage rate is now higher than the marginal productivity of labor. But with wages fully flexible downward, the money wage rate will fgll until full employment has been restored. Full employment means a restoration of the former level of output, but this can now only be sold at a lower price than formerly because there exists a positive demand for cash balances. A new full employment equilibrium position will exist in which wages have fallen more than prices. The marginal productivity of labor is lower because the effect on expenditure of the increased real burden of debt, caused by deflation, has not been offset by expenditure of the windfall gains accruing

to creditors. Here again, though, wage flexibility has insulated the economy from unemployment and a reduction in output which otherwise might have been caused by deflation.

The above conclusion must be qualified. It holds true only if creditors at some point are willing to stop accumulating their windfall gain in real balances. If they are not willing to do this, then a permanent gap between aggregate demand and full employment output will develop. In effect, demand has decreased on the part of debtors as a result of the increase in their real debt. This decrease has not been matched by an equal increase in demand on the part of creditors who experience windfall gains. Unemployment results, causing falling money wages. Prices also fall, but can not fall enough to restore aggregate demand to the full employment level. , In terms of our classical model, the money wage rate, and P, the price level, fall together. This means the real wage p, can never be decreased enough to bring about full employment. The willingness on the part of creditors to accumulate real balances indefinitely causes, in the presence of downward wage and price flexibility, an infinite deflationary spiral without ever restoring full employment. But this result is hardly surprising. This is the familiar conclusion that an uncloseable gap between aggregate demand and full employment output with downward flexible prices and wages will cause prices and wages to fall endlessly without bringing about a move back to full employment. It is simply arrived at through a less familiar route.

It is extremely improbable that economic growth would be hindered because creditors were willing to allow their windfall gains to accumulate indefinitely. Such an assumption is hardly more realistic than the assumption that all such windfall gains would be spent.

2.3.1 Deflation and the Rate of Interest

We see from (5) and (6) that savings and investment both depend on the rate of interest, and from (7) that in equilibrium savings will equal investment.

It has been shown that starting from a position of full employment, only under highly improbable conditions will deflation affect employment and output as long as wages have downward flexibility. To complete our analysis of the effects of deflation on growth we must see how deflation affects saving, in-^ vestment, and the rate of interest.

57it has previously been stated several times that a changing price level affects the real rate of interest by altering the purchasing power of the money that must be repaid for the loan. Assume that m dollars is borrowed in period 1 at r nominal rate of interest and that the loan is repaid in period 2. Assume further that the rate of change of prives is v percent so the price level in period 2 is P(1 + v). Let the real rate of interest be R and the price level in period 1 be P. The specific nature of the relationship between the real rate of interest and the change in the price level can now be easily shown.

(5)-a s =s (r,v) (6)-a i =i (r,v) If prices are stable, the nominal rate of interest alone will determine the savings and investment schedules. But if prices are declining (or rising), the rate of decline (or increase) will also affect these decisions.

The real value of the sum borrowed in period 1 is p. The real value of the sum offered in repayment of the loan at the end of period 2 is p|i 4 y| * ^ follows that: + r) (1) reduces to (2) R ^ Rv = r - v and when both R and v are small, Rv becomes negligible so that (1) shows that the real rate of interest depends on the real rather than money values of the amount borrowed and repaid. The real rate of interest then equals the nominal rate of interest minus the rate of change in prices. If prices are stable, the real and nominal rates of interest will be equal. If pricesare falling, vis negative so that the real rate of interest will be higher than the nominal rate.

2.4 Deflation and Investment

The following discussion is based on Patinkin. We will first consider the effect of a declining price level on the allocation of an individual's consumption between present and future goods, or what is the same thing, between consumption and saving. Full employment, flexible wages, and an initially stable price level are assumed in a world of certainty. A two-period time horizon will be used in which the individual receives money income in the first part of each period. The individual then may reallocate his expenditures over time by borrowing or by saving and lending.

P = price level in period 1 r = nominal rate of interest

v = rate of change in prices MUj = marginal utility present consumption MUg = marginal utility future consumption

In equilibrium, an individual will maximize his utility by allocating his consumption over time so the marginal utility of a dollar's worth of present consumption equals the marginal utility of a dollar's worth of future consumption. The price level in period 2 will again.be $P(1 + v)$.

We have (1) = marginal utility of a dollar P spent on present consumption and v 1 present dollar spent on future consumption so that in equilibrium utility will be maximized when By manipulation of (3) we have Let us concentrate on (4) and its implications for individual savers. The marginal rate of substitution of present for future goods is given by (4). If the price level begins to decline so that the real rate of interest increases, the marginal rate of substitution of present for future goods will decline. With the usual assumption of a diminishing marginal rate of substitution, a decline in prices will mean a decline in the marginal utility of future consumption, or in other words, an increase in future consumption relative to present consumption.

Now let us turn to investors and see how their behavior would be influenced by a decline in prices. Again let us assume a two-year time horizon and an initially stable price level. Let us consider the decision facing a firm regarding the profitability of investing X dollars in a machine that will produce a fixed number of units of goods over its useful twoyear life span. Let P be the price per unit, net of all costs, at which the output can be sold. Then the rate of return on capital, or marginal efficiency of capital, will be q where An anticipated decline in prices will decrease the numerator of the fraction on the right hand side of this equation. With the fixed dollar investment D, the marginal efficiency of capital q must fall. This result is easily understood. A decline in prices will reduce the anticipated money profits realized over the life of the investment. A decline in prices will therefore tend to lower investment by the firm.

It should be noted that the increase in the real indebtedness of the firm caused by declining prices will not alter the above analysis unless it causes the firm to fail. The increase in real indebtedness works through the debt incurred by the firm previous to the decline in prices. The only way it can affect the expected profitability of new investment is through its influence on expectations concerning the future course of prices. Once these expectations are formed, the anticipated decline in prices will be taken into account in calculating the money return on new investment.

We now combine the savings and investment analysis to see the effect of a decline in prices on investment.

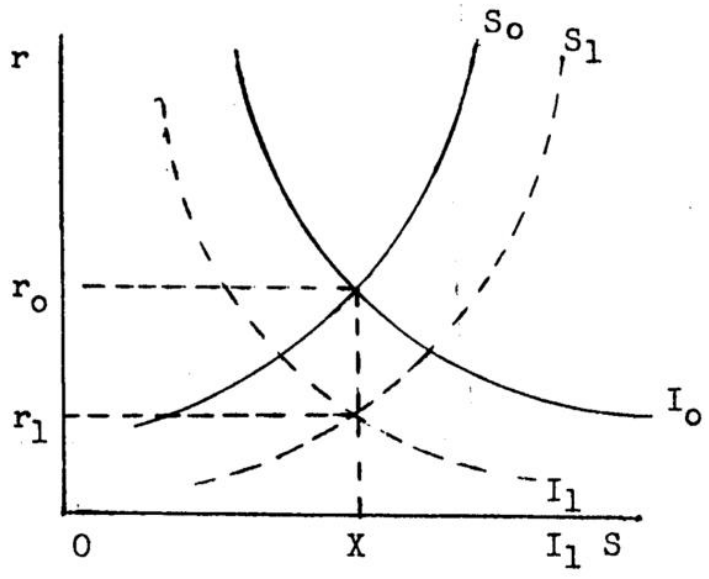


Figure 3.

In Figure 3, I_1 and S_1 are the investment and supply schedules drawn on the assumption of a stable price level. The nominal rate of interest is initially ro, with investment and saving OX. Now let us assume that prices begin to decline, and it is anticipated that they will continue to decline at the same rate, perhaps because of failure of the money supply to exapnd as rapidly as output. As we have seen, the decline in prices will cause profit maximizing individuals to increase their future consumption relative to present consumption. This means that the savings schedule will shift to the right to, say, S±. We have also seen that a decline in prices will lower the marginal efficiency of capital by reducing anticipated money profits over the life of the investment. This means that the investment schedule will shift to the left to, say I]_.

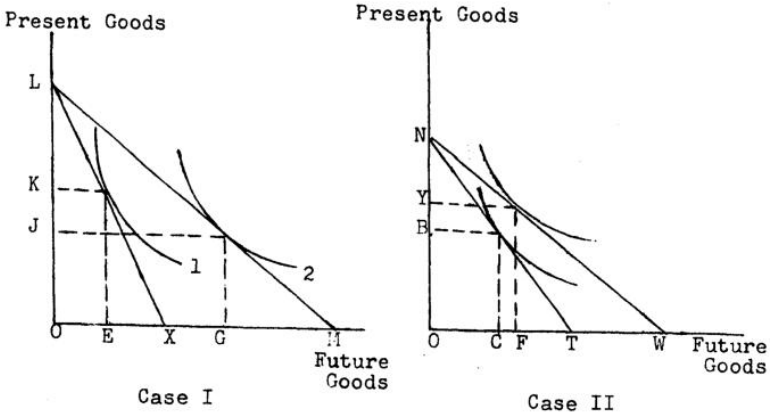
After savers and investors have adjusted their behavior to take account of the anticipated price decline, a new equilibrium will be established. The nominal rate of interest in this new equilibrium is r ^ , and investment and saving are OX. The nominal rate of interest is lower, but investment and saving are unchanged. The shifts in the savings and investment functions have exactly offset each other. Changes in the nominal rate of interest r have exactly offset the decline in prices v, so that the real rate of interest R remains unchanged.

There is, of course, a limit to the extent to which a decline in the nominal rate of interest can compensate for a declining price level. The decline in the nominal rate of interest will be limited by its level before the decline in prices occurs, since the nominal interest rate can fall no lower than zero. Thus, if the rate of price decline is in excess of the absolute value of the nominal interest rate before the decline begins, the real rate of interest must rise as a result of deflation. The nominal rate of interest cannot fall enough to offset the effect of declining prices, and unless productivity increases are large enough to shift the MEC curve sufficiently to the right, investment will decline.

We have drawn the new investment and savings schedules so that they exactly offset each other. Under these circumstances, the decline in prices will not affect investment, and so will not affect the rate of economic growth in this way. It is obvious, though, that the shifts in savings and investment need not exactly offset each other and so be neutral in their effect on investment. Depending on the utility functions of individuals underlying the savings schedule, and the investment functions

of firms underlying the investment schedule, investment at the new equilibrium could be greater or smaller than in the old. There is thus no way to tell a priori whether deflation will result in greater or lesser investment, or whether it will affect investment at all. It will be argued later that the data seems to indicate that shifts in savings and investment were not neutral during the period 1873-1896, but that the shifts resulted in a lower nominal rate of interest and a higher level of investment.

Patinkin's analysis must be extended in one respect. Hidden in his analysis is an implicit assumption concerning the shape of the individual's utility indifference curves. He assumes that these curves have the shape of those shown in Case I in



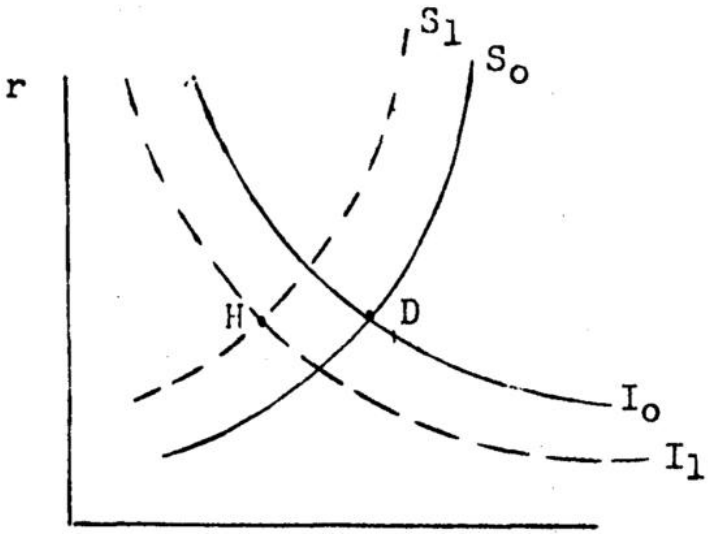
The rate of interest, both nominal and real, when prices are stable is shown by the slope of LX. The initial endowment is at L. In the initial equilibrium when prices are stable, the individual will be allocating his consumption over time so that he will consume OK present goods and OE future goods. Now suppose the price level declines at an anticipated rate so that the real rate of interest increases. The new real rate of interest is shown by the slope of L;'. To maximize his utility, the individual will now reallocate his consumption over time, since the terms at which he can trade present for future consumption have improved. After adjusting to the new real rate of interest, the individual wall be in a position of equilibrium in which he is consuming OJ present goods and oo future goods. He will now consume JK fewer present goods and XO more future goods. He will increase his saving exactly as Patinkin predicts.

But now look at the individual whose indifference curves are shaped like those in Case II. The initial endowment is at N. The same.corresponding real rates of interest as in Case I are shown by NT and NW. Under stable prices, the individual in Case II consumes OB present goods and OC future goods. He adjusts his consumption to the decline in prices by reallocating his bundle of present and future goods so that he tries to take OY present goods and OF future goods.

This allows him to attain the highest level of utility at any given interest rate available to him with his fixed endowment. In his new equilibrium position the individual will consume PY more present goods and CF more future goods.

How can an individual choose to increase consumption of both his present and future goods at the same time? It is easily done. The increased real rate of interest improves the terms of trade between present and future goods. Under the new terms of trade, fewer present goods can be given up in return for an increased quantity of future goods. The individual in Case II is not an unusual fellow. He simply has an inelastic demand for future goods in terms of present goods. And he is also lucky enough to have all his endowment in the first time period.

The individual in Case II saves less as a result of the decline in prices. This is not the behavior predicted by Patinkin. How does this affect Patinkin's analysis?



In Figure 5, IQ and SQ are drawn just as in Figure 3. They assume a constant price level. When prices begin to decline, the investment function will shift leftward to 1 for the same reasons as before. The decline in prices lowers the marginal efficiency of capital. The savings function now shifts to the left instead of to the right as before as individuals now desire to save less at any given nominal or real rate of interest.

The initial equilibrium under stable prices occurred at D. As a result of the decline in prices a new equilibrium position will be established at H. In the new equilibrium the nominal rate of interest may be either higher, lower, or the same as before, but the real rate of interest will be higher and investment will be lower. Individuals have succeeded in consuming more present goods. It is the reduction in investment which makes possible the increased present consumption.

Individuals have not succeeded in obtaining more future goods. To accomplish this would be impossible since investment has fallen. The initial decline in prices, while the nominal rate of interest remained unchanged, increased the real rate of interest so that present goods could be traded for future goods on more favorable terms. It was this change in the real rate of interest that caused the shift to the left in the savings function and the investment function. But the real rate of interest may not remain at this higher level permanently. The real rate of interest depends on the nominal rate of interest and the rate of price decline. We have shown above that the nominal rate of interest may change as the result of the shifts in the savings and investment functions. The real rate of interest will change again if the nominal rate of interest changes. It may increase or decrease, depending on whether the nominal rate increases or decreases.

In any case, the quantity of future goods obtained depends not only on the real rate of interest, but also on the quantity of savings. - Figure 5 shows that the quantity of savings will be lower after prices begin to decline than before. This decline in savings will combine with the change in the real rate of interest to make the quantity of future goods available smaller as a result of the changes brought about by the advent of a declining price level. The physical quantity of future goods available will be smaller because of the reduction in investment and saving in the first period.

This extension of Patinkin's analysis does not alter in any way his conclusions that an anticipated decline in prices may result in no change, an increase, or a decrease in future investment. The way

in which deflation affects investment depends on the nature of the utility functions of individuals and the investment functions of firms.

2.4.1 Other Obstacles to Growth

Keynes has pointed out several other ways in which deflation might retard growth. He demonstrated the conditions under which unemployment and a lengthy (if not endless) deflationary spiral could persist even with (or perhaps because of) downward wage flexibility (Keynes made clear in his analysis of unemployment that he was not excluding the possibility of downward wage flexibility). We have already examined this possibility. The existence of a liquidity trap which prevented the lowering of the rate of interest sufficiently to equate savings and investment, so that a gap in full employment output and aggregate demand occurred, was one way this might happen. The same lack of unemployment and endlessly falling prices and wages could occur if the investment schedule were sufficiently interest inelastic so that savings and investment could not be equated at a positive rate of interest.

What might cause this liquidity trap or inter est inelastic investment schedule to exist? Keynes emphasized the role of expectations in explaining the presence of the liquidity trap. Expectation of a continued decline in prices which would enhance the real value of cash balances would increase the incentive to hold cash balances. If the investment schedule does exhibit high interest inelasticity, such as the curve I I in Figure 6, then a slight decline in the investment function might make it impossible for savings and investment to be equated at a positive rate of interest.

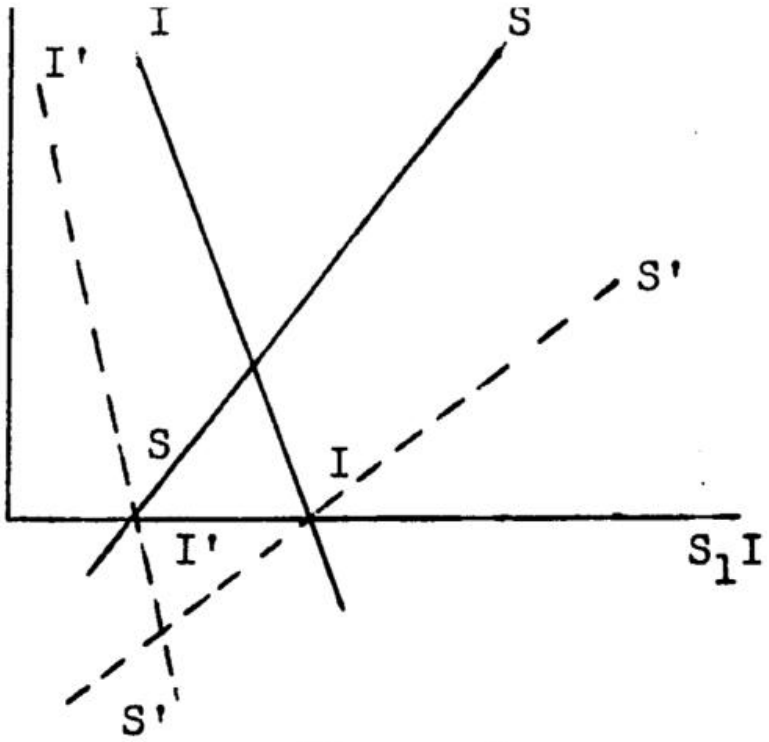


Figure 6.

This is shown in Figure 6 where savings, SS, remains constant and investment shifts to I' I '. This conclusion is strengthened if the S' savings schedule shifts to the right to S'S' at the same time that investment declines.

2.4.2 Redistribution Effects

No discussion of deflation and economic growth would be complete without mention of the effects in income redistribution caused by deflation. A declining price level will redistribute income in favor of those living on fixed or relatively inflexible incomes, and creditors, and away from debtors and those whose wages and salaries are relatively flexible. The shift in income brought about by deflation is thus generally toward those with relatively higher marginal propensities to consume and away from those with relatively lower marginal propensities to consume. Taken by itself, this shift in income would be likely to increase consumption and decrease saving out of any given level of national income. But there are other factors which will tend to offset this, such as the increased incentive to save caused by falling prices.

The shift in income brought about by deflation might, if it results in greater consumption,.offset the reduction in investment so that total absorption, the sum of consumption and investment, would remain the same. If this occurred, then full employment would be maintained even without downward wage flexibility. This is shown in Figure 7. Full employment is assumed.

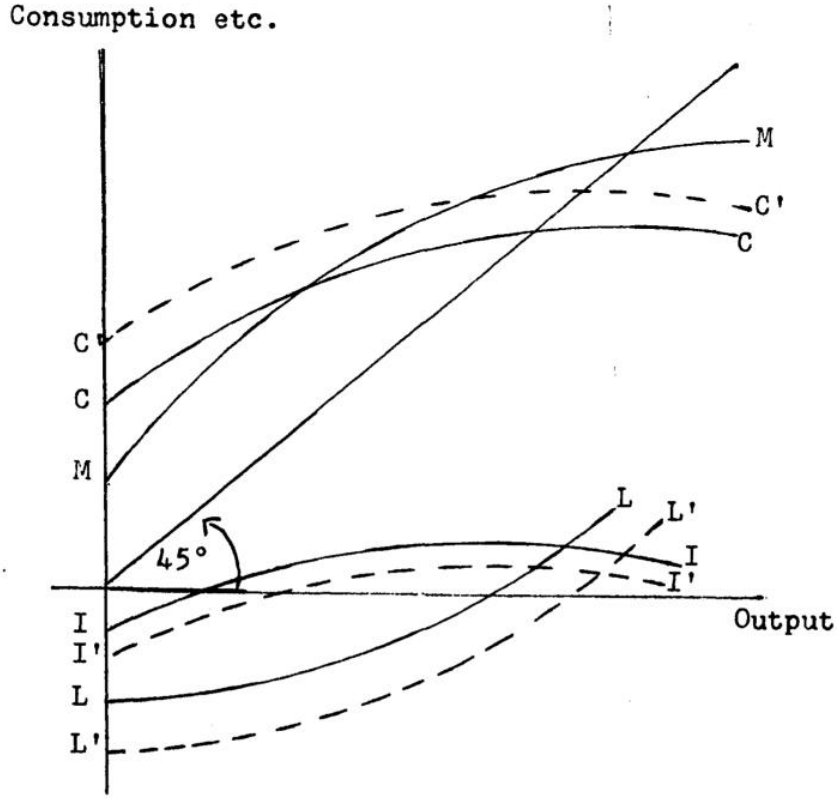


Figure 7.

Real consumption, investment, and actual accumulation with stable prices are shown by C C, I I, and L L. The deflation results in a redistribution of income toward those with higher marginal propensities to consume, so that total consumption is now increased to C 'C '. The deflation discourages investment which shifts to I'I*. Actual accumulation under deflation is shown by L'L'. We have constructed Figure 7 so that the consumption increases by an amount identical to the decline in investment. This means that total absorption, shown by M M, remains unchanged, and with it output and employment remain unchanged.

The changes in consumption and investment need not offset each other perfectly; indeed, it would be unlikely that this would happen. If investment declines more than consumption increases, a decrease in employment and output would occur; if it declines less than consumption increases, the decline in prices will be reversed.

There are limits to the extent to which this mechanism working through the effects of a redistribution of income could maintain aggregate expenditure. If the deflation is a persistent one caused by a declining money supply, it would be highly unlikely that aggregate expenditure would be maintained. In any case, investment would be reduced as a result of the deflation, and this would lower the future rate of growth.

2.5 Summary

In an economy characterized by downward wage flexibility, deflation is unlikely to produce any serious unemployment and reduction in output. There is no way to say a priori what effects deflation will have on investment; investment is as likely to increase as decrease. There is thus no real reason to expect that where wages are flexible downward, deflation will slow the rate of growth. It is just as likely to increase the rate of growth by increasing investment. Only by introducing the dynamic variable of pessimistic expectations can deflation be expected to produce definitely harmful effects on economic growth. But the introduction of expectations as a variable can negate the results of any theoretical analysis. Whether deflation has in fact retarded growth can only be ascertained by an examination of the period in question.

Chapter 3

Growth of Output

The entire period from 1873 to 1896 in the United States was marked by great turmoil and controversy. The social and political upheavals of this period have been well documented, and volumes have been written concerning them by American historians. It can not be argued that the popular histories which have chronicled the great unrest and agitation of this period are inaccurate reports of the underlying facts concerning the social and political events which transpired at that time, or of contemporary observations of those events. Yet these accounts may have unwittingly given rise to misconceptions which still persist today concerning the performance of the economy in this period. In any case, dramatic histories of this period have helped to obscure the nature of the economic growth that occurred from 1873 to 1896.

The years from 1873 to 1896 in the United States were dominated by economic issues. The great political debates of the period concerned economic questions, especially monetary questions. Controversy over monetary problems led to the formation of the Greenback Party in the early part of the period, and to the free silver movement after that. National and local elections hinged on these monetary issues, and they dominated all other issues before Congress during this period. Only with the defeat of William Jennings Bryan in the presidential election of 1896 did the controversy over money come to an end.

Agriculture was also a major section of unrest in this period. Farmers complained bitterly about their economic status, and formed political action movements in an effort to secure changes that they felt would improve their lot. The Populist movement was born this way and became a political force to be reckoned with. Farm issues were in a continual state of ferment throughout this period.

Labor was still another sector of unrest from 1873 through 1896. This was the period when Coxey's Army marched on Washington to demand better pay and welfare for workers. The rapid rise and fall of the Knights of Labor occurred in the middle of this period. The American Federation of Labor was born and the guiding priciples which still largely reflect its philosophy of today were formed during this interval.

This period was also punctuated throughout by bloody strikes such as the Homestead Strike in 1S92.

Historians have rightly focused on these economic disturbances as the dominant features of this period. Nevertheless, too much about the rate of economic growth in this period can be inferred from histories highlighting the economic unrest present at[1] that time. There need not be a

[1]Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States*: 1867-1960 (Princeton: Princeton University Press, 1963), p. 8 8. . Benjamin Andrews, "The Fall of Prices—The Cause and the Cure," in Trumbull

strong correlation between the rate of economic growth and economic unrest of the populace.'1' Contemporary observations can not be relied on with certainty to indicate how the rate of growth is changing if the data on which these observations are based are scanty, uncertain, or imprecise. Observations of economic growth based on such data may do little more than reflect the prevalent attitudes of producers and consumers, including those of the observer, toward current economic conditions. If trained observers must, for lack of better indicators of There is no reason to believe that rapid economic growth resulting in generally increasing standards of living will be accompanied automatically by political and social stability. This much is clear from recent U. S. experience. Structural unemployment is likely to be high during periods of rapid growth. All incomes do not increase at the same rate. Those who are unemployed or lag behind in economic gains may be highly vocal in their complaints. The imprint left by a dissatisfied minority is likely to be far greater than the relative size of the minority group would indicate.

economic growth, depend on the general concensus of the public concerning economic conditions, the validity of their reports will depend upon how well these general attitudes reflect real changes in growth rather than changes in other variables.

Dissatisfaction, for example, might be expressed not because conditions are bad, but because they might be better. Even those who gain most from rapid growth might express discontent because of a belief that their gains might be still greater if conditions were different.

What might cause a widespread belief that economic conditions, even though rapidly improving, could improve more rapidly still? Such a belief would have to be based on something more substantial than mere public intuition. It would have to be based on the existence of some highly visible condition in the economy popularly associated with restraints on economic growth. An example of a condition that would meet these requirements is that of a rapidly falling price level.

A rapidly falling price level is easily apparent to all. That it was associated with harmful economic effects by those who lived during the period 1873-1896 is shown by David Wells' statement that "no fact is better recognized than that nothing is more productive of gloom to the industrial and mercantile community owning or carrying stocks of merchandise than losses experienced or anticipated through a fall[2] in prices.1' Friedman says of this period,"Observers of the scene then, no less than their modern descendants, took it for granted that sharply declining prices were incompatible with sharply rising output."[3] If the belief that falling prices are greatly detrimental to growth is strong enough, it may result in a failure to even recognize that rapid growth is occurring.

Contemporary Comment on Growth, 1873-1896 Having pointed out the difficulties involved in obtaining a correct picture of economic growth from the qualitative comments of contemporary observers, or from public sentiment concerning economic conditions, let us proceed to examine some of the comments of observers who were either on the scene or not far removed in time from this period.

E. Benjamin Andrews was a prominent economist of the time who viewed the period 1873-1896 as generally one of economic stagnation and depression.

^'Jells, op. cit., p. 115.

White (ed.) Silver and Gold (Publisher's Union, 1895), p. 304. E. Benjamin Andrews, "The Bimetallist Committee of Boston and New England," *Quarterly Journal of Economics*, VIII (April, 1894), 320.

[2]E. Benjamin Andrews, "The Fall of Prices—The Cause and the Cure," in Trumbull White (ed.) Silver and Gold (Publisher's Union, 1895), p. 304. Reported in Robert Hoxie, "Silver Debate of 1890," *Journal of Political Economy*. I (September, 1893).

[3]Commercial and Financial Chronicle, March 8, 1879, quoted in Don C. Barrett, The Greenbacks and Resumption of Specie Payments 1862-1879 (Cambridge": Harvard University Press, 1931), p. 241. ^Orton, op. cit., 3 4 3.

Andrews was actively engaged in the dispute over what type of monetary standard would best serve the U. S. Andrews saw in the gold standard the reason for the economic ills with which he felt the U. S. was afflicted. Consequently, Andrews favored a bimetallic monetary standard. Speaking of the gold standard and its effects, Andrews declared in 1894:

> The advance of gold monometallism is a grave threat to production and trade, to the welfare of the masses, and even to the stability of society. . . no small part of the industrial and social suffering of the,past twenty years is traceable to this cause.
>
> In this risk to industry from having to produce against a falling market. . . we see the reason why our banks overflow with funds which they cannot loan, and our streets with hungry men willing to work, but unable to find strong employers who have heart for productive enterprises.[4]

Now we have seen that unemployment, while no doubt causing suffering to those out of work, is not incompatible with rapid economic growth. As for his statement that banks could not find sufficient investment outlets for their funds, Andrews presents no data to support it. However, these figures are available and, while they will be presented in detail below, it should be noted here that the ratio of assets to investments and loans in 1894 when Andrews was writing was a little lower than it was in 1869, supposedly a year of prosperity, and was considerably lower than the same ratio in 1899, also an admitted year of prosper-

> * ity. Andrews' statement concerning the banks and the plethora of investment funds is not supported by the data for that period available today.
>
> I declare. . . that a fall in general prices places a fatal clog, handicap, or brake upon the creation of wealth. . . . The blight upon our business originates in that scarcity of full or exportable money, leading to a continuous and discouraging fall in general prices, which first made production and credit less and less profitable, and now at last makes them less and less possible. '

The ratio of commercial bank assets to investments and loans was 1. 3 6 in 1869, 1.[5] 2: 1 in 1894, and 1.[6] in 1899.

Andrews' belief that falling prices were harmful to economic growth may have colored his view of economic events.

Another pessimistic view of this period was given by Senator Jones of Nevada in a speech in the Senate during the silver debate of 1890. Speaking of falling prices, Senator Jones said:

> It is my firm conviction that the inexpressible miseries inflicted upon mankind by war, pestilence and famine have been less cruel, unpitying and unrelenting, than the persistent, and remorseless exaction which this inexorable enemy has made upon society. As the volume of money contracts, prices decline, and with the decline of prices comes stagnation of industry. . . . Stores, workshops and factories, unoccupied and unused, are found on every hand. Crime increases, bankruptcies multiply, and even though the aggregate of wealth augments, it is unjustly distributed, and is consequently barren of results.®

Senator Jones represented the silver interests[7] > of Nevada and urged that the money supply be increased through restoration of the free coinage of silver. It is difficult to assess the validity of

[4]Ibid., pp. 48-49.

[5]Ibid., pp. 43-49.

[6]Ibid., 495.

[7]It has been argued that during the Industrial Revolution in England, the standard of living of workers declined. T. S. Ashton in "The Standard of Life of Workers in England, 1790-1830," in the *Journal of Economic History*. March, 1959, concluded that the Industrial Revolution was accompanied by an increase in the standard of living of workers. Ashton's

Senator Jones' statement. His comparison of the effects of deflation with those of war, pestilence, and famine may be a little extreme, but we can not be sure that his observations of unemployment and unused productive capacity are equally exaggerated.

In 1879 the Commercial and Financial Chronicle

commented on conditions in agriculture. It wrote, "Where is the prosperity. . . ? is the question frequently coming to us. Wheat is no higher. Corn is no higher. There is no money in any of the earth's products. Where is the promised prosperity?"[8] In 1895 the same type of comment could still be found. Writing in the Journal of Political Economy in that year, Jesse Francis Orton lamented the plight of the farmer under falling prices.

First-hand observations such as those above support the contention that the years from 1873 to 1896 were years of deep depression at worst or general ly poor economic performance at best. This conclusion has also been accepted by some other{economists who have investigated this period from a 'historical perspective. In fact, this became the prevalent view concerning this period, and has only recently been seriously challenged.

Warren and Pearson in 1935 compared the seventeen years of falling prices from 1880 to 1896 with the seventeen years of rising prices from 1897 to 1913* The former period, they say,

> was characterized by a large number of failures of farmers, business concerns, and banks, by unemployment, tramps, strikes, riots, Coxey's Army, and Populism. The second period was characterized by disappearance of tramps, full employment, agricultural prosperity, rapid development of agricultural education and other public services, and improvement in housing facilities. In the latter part of the period, the rising costs of livihg became a problem.[9]

This analysis of Warren and Pearson is somewhat puzzling. When referring to the economic stagnation they claim was caused by falling prices, they fail to present any quantitative data supporting their analysis. When speaking of the relationship between[10] falling prices and tramps, they refer the reader to a footnote which explains that a farm purchased by the state of New York to take care of the increased number of tramps caused by deflation was not needed because prices turned upward and the tramps disappeared. But, "with declining prices, specimens of the tramp species[11] have reappeared in abundance." The footnote also "[12]Warren and Pearson, oja. cit. , pp. 269-70.

explains that Warren was a member of the commission appointed to purchase the farm. One must ask the question of why Warren and Pearson document their history of the period and their case against deflation in this manner when in the same work and just a few chapters earlier, they present a series on physical output in aggregate and by key sectors covering this period of deflation.

This series constructed by Warren and Pearson shows an annual increase in the physical volume of industrial output of about 4 percent from 1873 to 1896. The physical volume of production per

conclusions were challenged by E. J. Hobsbawm in an article entitled "The British Standard of Living, 1790-1850," in the Economic History Review. August, 1957. Hobsbawm's conclusions in turn were challenged by R. M. Hartwell, who defended Ashton's findings in "The Rising Standard of Living in England, 1800-1850," in the Economic History Review, April, 1961. Even affirmation of the fact that the standard of living of workers did decline would not be sufficient to show the existence of depression during the Industrial Revolution unless depression is defined to mean a decline in income per worker. Per capita product might increase but income per worker decrease through a redistribution of income away from labor.

[8]Rezneck, oja. cit., 507.

[9][chart data, omitted]

[10]J. Laurence Laughlin, "Gold and Prices Since 1873 j" *Quarterly Journal of Economics*. I (April, 1887), 329.

[11]Ibid., 327.

[12]Ibid., 331-40.

capita as shown by this series increased at an annual rate of about 2 percent in the same period.[13] This series will be examined in greater detail below. This is relatively rapid growth in terms of both aggregate increase and increase per capita. Warren and Pearson do not reconcile their verbal description of this period as one of stagnation with the evidence presented in their physical output series showing rapid economic growth.

More recently, Samuel Rezneck and Charles Hoffman have investigated parts of the period 1873-1896 and concluded that these sub-periods were explains that Warren was a member of the commission appointed to purchase the farm. One must ask the question of why Warren and Pearson document their history of the period and their case against deflation in this manner when in the same work and just a few chapters earlier, they present a series on physical output in aggregate and by key sectors covering this period of deflation.

According to Rezneck, what began as a financial panic in 1873 "rapidly developed into a prolonged period of industrial and business depression, lasting until 1879. . . ."[14] Although he cites some statistics on declining prices and production in a few lines of output, Rezneck focuses more on the manifestations of social unrest which accompanied the state of depression which he claims existed. For example, he says:

> The circumstances of rapid urban industrial development combined with the distress of prolonged depression to produce mass discontent and to foster the fermentation of radical economic and social doctrines, in which indigenous elements were blended with newly imported European theories and influences. Out of these emerged a complex pattern of political and social movements, some of which were even magnified by the sharpened fears flourishing in depression into the vague shape of a communist scare, one of the earliest in American experience.[15] °

Samuel Rezneck, "Distress, Relief, and Dis

content in the United States During the Depression 1873-73," Journal of Political Economy,.LVIII (December, 1950), 494-512; and Charles Hoffman, "The Depression of the Nineties," Journal of Economic History, XVI (June, 1956), 137-64.

^Rezneck, op. cit., 494.

Mow periods of prolonged depression are not usually considered to be conducive to rapid urban industrial development. Under most circumstances, the two would even be considered contradictions in terms.[16] The statement that the two occurred together deserves more than the casual treatment given by Rezneck.

Rezneck also cites as evidence of the depression the fact that the number of trade unions declined from thirty in 1873 to nine in 1878, and that total[17] trade union membership also fell. Taken by itself, this might indicate the converse, that the period was one of prosperity. When income and living standards are increasing, workers may feel no need for unions with a resulting decline in the number of unions and union membership.

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[13]Wells, op. cit., preface, pp. V, VI.

[14]Taussig, op. cit. . p. 10S.

[15]Ibid., p. 98.

[16]Wesley C. Mitchell, ' 'The Quantity Theory of the Value of Money," *Journal of Political Economy*. IV (March, 1896), 159-61. Source: Estimates of GNP and NNP from Simon Kuznets, *Capital in the American Economy*: Its Formation and Financing (Princeton: Princeton University Press, 1961), Table R-12, p. 521. these variants are similar. For a description of these three variants see Kuznets, *Capital in the American Economy*, o p. cit., pp. 472-74.

[17]Kuznets, *Capital in the American Economy*, op. cit., p. 505. 35ibid., pp. 534-3 5. Source: Kuznets, *Capital in the American Economy*, Cols, 1.3, Table R-26, p. 5§3; Cols. 2, 4, Table R-40, p. 633.

But Rezneck is not without some precedent in making the assumption that the years from 1873 through 1878 were years of depression. The National Bureau of Economic Research designates October, 1873, as the peak of a reference business cycle, and March, 1879, as the next trough. The NBER thus designates the period studied by Rezneck as a period of contraction of sixty-five months duration. This is the longest period of contraction on record in the NBER reference cycle series, which begins in 1854.

Hoffman's approach differs from Rezneck's. Hoffman is concerned with changes in key economic variables and not with the social consequences. Hoffman places major emphasis on fluctuations in investment, and traces out declines in major components of investment beginning in 1893. He cites a decline in railroad investment as being one of the key factors shaping the depression.

According to Hoffman, aggregate consumption declined between 1893 and 1897.[18] The decline in per capita consumption was even greater because of population growth during the period. Hoffman cites ^Hoffman, op. cit., 148.

unemployment approaching 2 0 percent of the labor force 20 and bank failures as other hallmarks of this period. Because of the magnitude of these changes, Hoffman describes the depression of 1893 as one of the most severe in Ui S. history.

Hoffman's argument that growth was retarded from 1893 to 1896 is more convincing than that of Rezneck's pertaining to the period 1873-1878. With the exception of Hoffman, the claim that deflation was accompanied by retarded growth in the period 1873 -1896 has been supported largely by reference to popular agitation for economic reforms in this period.

Fortunately, we need not rely solely on qualitative evidence to obtain a picture of economic growth in this period. Several noteworthy attempts have been made to construct an index of output in the U. S. covering the nineteenth century. Attempts to extend these indexes back in time beyond 1870 have met with many obstacles, and the results of these attempts are admittedly tenuous. But because of a great volume of work done by different individuals on various segments of output after 1870, the estimates of national income after that year can be considered more reliable. But before we examine these estimates of national income, let us look at some more reports from on-the-scene observers which give us an entirely different picture of the years 1873 - 1896 than the reports discussed above.

Edgeworth was not sure whether growth was retarded or increased by the decline in prices. Writing in the Quarterly Journal of Economics in 1889, Edge-worth, commenting on the reason for the secular decline in prices, said, "Whether it is the gold which has been curbed or the goods which have been spurred, or whether and in what degree both agencies may have operated must be left to other observers.

> To support the claim that we are now dealing with practically new conditions of production, no facts of the industrial situation since 1873 can be ad-, duced which are more convincing than those relating to improvements and new sources of supply. The period following a great financial upheaval is naturally crowded with improvements in processes and in methods of lowering the cost of production. Necessity becomes the mother of invention.[19]

Laughlin goes on to cite numerous improvements in technology in different industries. He credits these improvements with making available increased out-^ put and lower prices. ' David

[18] Simon Kuznets, "Long-Term Changes in the National Income of the United States of America Since 1870," in Income and Wealth of the United States: Trends and Structure, Income and Wealth, Series II (Cambridge, England, Bowes and Bowes, 1952), p. 37.

[19] Ibid., p. 38.

A. Wells, who was a Special Commissioner of the Revenue during part of this deflationary period, kept a detailed record of his impressions of economic conditions. Writing in 1899, he said:

> The economic changes that have occurred during the last quarter of a century—or during the present generation of living men—have unquestionably been more important and varied than during any former corresponding period of the world's history. It would seem, indeed, as if the world, during all the years since the reception of civilization has been working up on the line of equipment for industrial effort—inventing and perfecting tools and machinery, building workshops and factories, and devising instrumentalities for the easy intercommunication of persons and thoughts, and the cheap exchange of products and services; that this equipment having at last been made ready, the work of using it has, for the first time in our day and generation, fairly begun; and also that every community under prior or existing conditions of use

2[20] Ibid., 329.

> and consumption, is becoming saturated, as it were, with its results. As an immediate consequence the world has never seen anything comparable to the results of the recent system of transportation by land and water: never experienced in so short a time such an expansion of all that pertains to what is called "business,'[21] and has never before been able to accomplish so much in the way of production with a given amount of labor in a given time.[22] ◦

Laughlin and Wells were joined in their belief that the thirty years of the nineteenth century were characterized in the U. S. by rapid economic growth by Frank W. Taussig.[23] According to Taussig, it was an admitted fact that the rich, the middle class, and the poor all bettered their economic positions during the deflation of 1873-1896.[24] Taussig claims that for these reasons the argument that deflation checks industrial progress and promotes deflation was insisted on less in regard to the United States than for European countries. To Taussig, the great increase in output that occurred during this period was the key to the decline in prices. He stated:

> The immediate cause of the fall ih prices has been the pushing on the market for sale of larger and larger quantities of commodities produced with profit at lower and lower cost: a state of things fortunate for the community, and surely not depressing for the business man. ™

Another eminent economist at that time who reached similar conclusions concerning growth was Wesley C. Mitchell. Speaking of the interval between i8 6 0 and 1891, Mitchell said:

> There can be no doubt whatever that the amount of commodities exchanged in the United States increased vastly during this period. Of course there are no statistics which show the exact ratio of this increase; but some data are accessible that may be taken as a basis for an estimate. The increase in the amount of agricultural products is indicated by the following facts. Between the years i8 6 0 and 1891, the production of cotton increased 8 9 percent; of wool 2 8 0 percent; of sugar 89 percent; of molasses 4 0 percent; of corn 77 percent; of wheat 1 3 0 percent; of farm animals 1 1 3 percent. In manufactures the increase is even more marked. The census of i860 reported the total value of manufactured products for that year as.151,885,#61,6 7 6. The Census of 1890 gives the amount as $9,372,43,283. This is an increase of 397 percent. . . . What has

[20] Ibid.

[21] Friedman and Schwartz, op. cit., pp. 32-41* *For an explanation of Friedman's methods see Milton Friedman, "Monetary Data and National Income Estimates," Economic Development and Cultural Change. (April, 1969), 273-82.

[22] Friedman and Schwartz, op. cit., p. 39.

[23] Ibid.

[24] Robert E. Gallman, "Commodity Output, 1839-1899," in Trends in the American Economy in the Nineteenth Century, Studies in Income and Wealth, Volume 24, Source: Col. (1) Robert Gallman, "Commodity Output, 1839-1899," in Trends in the American Economy in the Nineteenth Century, Volume 24, Studies in Income and Wealth (Princeton: Princeton University Press, 1960), Table 1, p. 16. Col. (2) Kuznets, *Capital in the American Economy*, Table R-21, p. 553.

> been presented indicates that] agricultural production somewhat more than doubled in the thirty years, while the value of the manufacturing output increased nearly five-fold. Perhaps equally valuable as indications of the increase of transactions are the following more general statistics. The imports of merchandise increased 1 3 8 percent during the period, while the domestic exports gained 175 percent. The true valuation of the real and personal property of the

3°Ibid., p. 111.

has in recent times been made available. We shall now examine some of this data on aggregate growth during this period as a check on the. observations of Laughlin and others. If this data confirms the fact that growth was indeed very rapid in this period, we shall have to consider at some point the apparent paradox of this period of rapid economic growth being also one of the periods of greatest social and economic unrest in the nation's history.

3.1 Statistical Evidence of Aggregate Growth

Before examining statistical estimates of growth, a word of caution would be in order. In general, the further back in time a series is extended, the less will be its reliability. This is particularly true for statistical series extending back beyond 1900.

It is inevitable that many of the series that will be presented here will lack precision. But precision is not necessary to point out direction and rough orders of magnitude. This should be kept in mind through the remainder of this work.

Simon Kuznets has undertaken much of the work done on estimates of national income in the latter half of the nineteenth century. Kuznets has constructed a set of estimates of Gross National Product for the

> country was # 1 6,1 5 9,6 1 6, 0 6 8 in 1869 and # 6 5,0 3 7,- 091,197 in 1890; a Rain of 302 percent. The increase, of population. . . was not quite 91 percent.-^

The contrast between opinions of growth in the U. S. from 1873 to 1896 is extreme. Mitchell may have indicated one of the key reasons for the existence of this confusion when he mentioned the lack of statistical data available at that time. Without this statis tical data only the roughest sort of estimates of growth could be made, and this may have caused the growth of the economy to be obscured for many by the social unrest and demands for monetary reform.

Yet economic growth of the nature and magnitude as that described by such competent economists as Laughlin, Wells, Taussig, and Mitchell must have been highly visible. An economic transformation like the one described by these men must have been obvious to even the most oblivious individuals. But the social unrest of this period and its economic origins are well-documented, and they must be accepted as fact. Can Laughlin, Wells, Taussig, and Mitchell have been wrong in their observations of economic growth? Much of the statistical data that was lacking for Mitchell U. S. extending back to 1869. These estimates are presented by Kuznets first in the form of yearly averages for decades overlapping at five year intervals. These estimates for Kuznets' Variant I of Gross and Net National Product are shown in Table III-1. The annual average rates of change are compound rates.

We find that Kuznets' estimates support the views of Wells, lMitchell, Taussig, and Laughlin that ^2For Kuznets' method of constructing these estimates see Simon Kuznets, Capital in the American Economy: Its Formation and Financing ("Princeton Princeton University Press, 1961), Appendices A and B.

^Kuznets has constructed estimates of three variants of GNP. The relative movements in each of growth after prices turned down in 1873 was very vigorous and rapid. And the contrast between the opposing views concerning economic performance in this period is, if anything, even more enhanced by the great magnitude of growth shown by Kuznets.

94

TABLE III-1

GROSS NATIONAL PRODUCT AND NET NATIONAL PRODUCT, KUZNETS VARIANT I, AVERAGES FOR YEAR AND RATES OF CHANGE FOR OVERLAPPING DECADES, 1929 PRICES (Billions of Dollars)

Overlapping Decade	Gross National Product	Net National Product
	AVERAGES PER YEAR	
1869-1878	10.5	9.49
1874-1883	15.1	13.7
1879-1888	19.7	17.8
1884-1893	23.4	20.8
1889-1898	27.3	24.0
1894-1903	34.0	30.0
	PERCENTAGE CHANGE	
1869-1878--1894-1903	224	4.7
1869-1878--1874-1883	44	7.6
1874-1883--1879-1888	30	5.4
1879-1888--1884-1893	18	3.2
1884-1893--1889-1898	17	2.9
1889-1898--1894-1903	25	4.6
	AVERAGE ANNUAL PERCENT RATE OF CHANGE	
1869-1878--1894-1903	4.8	4.7
1869-1878--1874-1883	7.6	7.6
1874-1883--1879-1888	5.5	5.4
1879-1888--1884-1893	3.5	3.2
1884-1893--1889-1898	3.1	2.9
1889-1898--1894-1903	4.5	4.6

Source: Estimates of GNP and NNP from Simon Kuznets, Capital in the American Economy: Its Formation and Financing (Princeton: Princeton University Press, 1961), Table R-12, p. 521.

The annual average rates of growth for overlapping decades are not sufficient to give us a picture of the timing of the changes in growth over this period, but they indicate that the rate of growth was most rapid early in the period and then slowed down before accelerating again at the end of the period. Fven the period of slowest growth, from 1834-1893 to 1889-189&, shows a relatively rapid annual rate of growth of To obtain a clear picture of growth in this period, annual estimates of income are needed. Unfortunately, the underlying data available has been so skimpy and uncertain as to preclude annual estimates of GNP. Nevertheless, Kuznets has constructed a series giving five-year moving averages of GNP and NNP. This five-year moving average is based on the overlapping decade averages we have just examined. Concerning the differences in reliability of the decade

averages and the five-year moving averages, Kuznets says, "These decade series. . . constitute the basis for the estimates for shorter time intervals. . and may be more acceptable to technical purists than the more hazardous (five-year moving average) estimates He further states that:

> We. . . devoted much effort to deriving annual estimates for the period before 1919. . . . The effort was only partly successful. For the early years of the period, 1$69-183#, the derived annual series, even for the comprehensive aggregates—gross and net national product—did not seem sufficiently reliable as annual measures to warrant presentation. (that) the calculation of five-year. . . moving averages. . . serve to cancel the short-term fluctuations while still revealing the underlying secular movements and any longer swings in them with sufficient accuracy. The limitations of the annual series are greatly reduced by the averaging process and therefore have only minor bearing upon the moving averages.

Kuznets' five-year moving averages of GNP in constant prices are shown in Chart III-l along with the same measure of per capita income. Because the figure for each year is a five-year moving average centered on the year, the year-to-year fluctuations shown in Chart III-l are undoubtedly considerably smoother than the changes that the actual yearly figures would show. But variations in the rate of economic growth during the years 1873 to 1896 can be clearly seen.

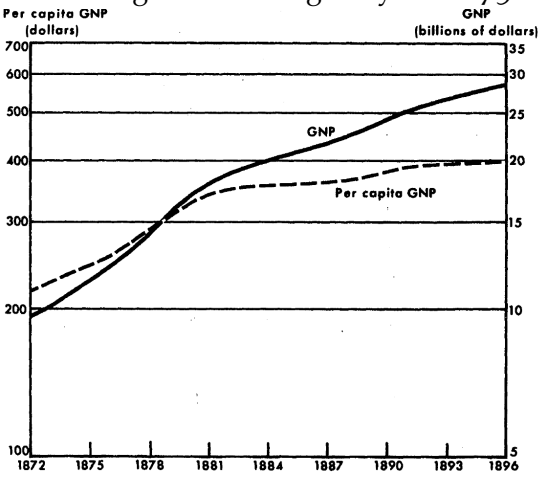

Chart III-1. Five Year Moving Averages of Total and Per Capita Gross National Product, 1872-1896, at 1929 Prices.

Source: Kuznets, Capital in the American Economy.

The rate of growth tapered off after this, and no other part of the period came close to matching the rate of growth of the first eight years, although the rate of growth from 1880 to 1896 still remained very high. From 1880 through 1890, GNP increased at an annual rate of 3*8 percent. The rate of growth seems to have been more rapid after 1887 through 1890 than in the years 1882-1887. From 1890 to 1900, GNP increased by 4 percent per year, slightly faster than the rate of the previous decade. Most of this gain occurred after 1895. The rate of growth from 1890 to 1895 was about the same as that for 1882-1887. Estimates of GNP for selected years are shown in Table III-2.

The rate of growth of population was also very high during the years 1873-1896. Population grew at an annual rate of 2. percent for an increase of 69 percent during this period. But even though population grew at a rapid rate, per capita GNP increased rapidly.

99

TABLE III-2

FIVE YEAR MOVING AVERAGES OF GROSS AND NET NATIONAL PRODUCT AGGREGATE AND PER CAPITA, IN 1929 DOLLARS FOR SELECTED YEARS, 1871-1899 (Aggregate Figures in Billions of Dollars, Per Capita in Dollars)

	5 Year Moving Average, Gross National Product--Net National Product			
Centered on Year	Total (1)	Per Capita (2)	Total (3)	Per Capita (4)
1871	8.90	211	8.08	192
1875	11.4	247	10.3	224
1879	15.7	314	14.3	285
1884	20.2	358	18.2	323
1889	23.4	374	20.8	331
1894	27.6	399	24.3	350
1899	34.6	459	30.6	406

Source: Kuznets, Capital in the American Economy, Cols, 1.3, Table R-26, p. 563; Cols. 2, 4, Table R-40, p. 633.

From 1830 to 1890 there was a marked retardation in the growth of per capita income. The increase in this ten year period was only about 16 percent. Most of the increase in this period came before 1832 and after 1837. The decrease in the rate of per capita income in this period came almost entirely from the decline in the rate of growth of aggregate GNP. Population grew throughout the years from 1830 to 1890 at about the same rate as in the entire period 1873-1896. From 1891 to 1900, per capita GNP increased approximately 24 percent. This more rapid rate of increase was due in part to a faster increase in aggregate GNP than in the preceding decade, and in part to a slower rate of population growth than in the years previous to 1890. Most of the gain occurred after 1895. Per capita GNP:was virtually constant in the three years 1893-1895.

Kuznets' figures tend to support the contention of Hoffman and others that the first half of the decade of the 1890's was a period of relatively retarded growth when compared with the entire period of deflation. Aggregate GNP increased, but at a rate that equalled the slowest rate of the entire twenty-four year period, and at a rate that was roughly equal to the rate of population growth so that per capita income changed little. Aggregate and per capita GNP both grew at relatively slow rates in the years 1882-1886 or 1887. This behavior is roughly in accord with the National Bureau reference cycle series which lists the period from March, 1882, to May, 1885, as one of contraction, if by contraction is meant merely a slow down of the rate of increase. The five-year moving averages of aggregate GNP increased in each year of the period 1873-1896, and the same measure of per capita GNP increased in all but two years of the twenty-four year period.

But Kuznets' estimates of national income for the years 1873-1879 are in direct contrast with the image of these years presented by Rezneck, and with the National Bureau view of these years as the longest cyclical contraction on record. According to Kuznets' figures, economic growth in these years was remarkably rapid, and more rapid than in any other part of the deflationary period. Indeed, Kuznets shows the growth rate of these years as surpassed only by one other period in his entire series; the period of recovery from the depression in the 1930's.

Kuznets himself acknowledges that his estimates for the decade 1869-1879 ar© too high.3 He attributes this to his use of Shaw's series on commodity output, and refers to Shaw's own opinion that the Census of Manufactures of 1869 was understated relative 37 to the 1879 Census of Manufactures by 5 to 13 percent. Kuznets failed to adjust for this because, "We had no firm basis for 10 percent in 1869 and 0 percent in 1879, and because the effect on the decade averages was relatively minor."3 Thus, even if Kuznets' figures for these years were adjusted downward by the amount by which Kuznets feels they are overstated, the annual rate of change would be only slightly affected.

There is thus some reason to question Kuznets' estimates, especially for these years. Friedman has been able to shed some additional light on growth from 1869 to 1879. Friedman's figures constitute a check on Kuznets' estimates. Using data covering the money supply, velocity, and prices, Friedman constructed two sets of estimates for this period. Friedman's first, or crude set of estimates is statistically completely independent of Kuznets' GNP estimates. For his second, or refined set of estimates, Friedman used the price index implicit in Kuznets' GNP series to derive velocity. The refined estimates are thus not completely independent, but no quantity data used by Kuznets was used by Friedman.

There are other indications that growth was generally rapid throughout the entire period 1873-1896.

Immigration was heavy throughout this period, and amounted to 33 percent of the total population growth from 1870 to 1899. Immigration was especially heavy in the 1880's, when it accounted for about 1+2 percent of total population growth. The years from 1880 to 1834 marked the heaviest rate of immigration per thousand population in U. S. history, with 1882 the highest single year. There is some question about whether immigrants are attracted to a country because of a high standard of living, of because of a rising standard of living. They are probably attracted by both, and the rapid growth of the economy from 1873 to 1896 may have helped to induce the heavy immigration. The surge in the laready high rate of immigration from 1880 to 1884 may have been due at least partly to extremely rapid growth in the l870rs.

Indexes of production by Warren and Pearson, and by Nutter also show very rapid growth after 1873- Warren and Pearson constructed an index of total basic physical production per capita. This index includes all crops, forest products, and mineral production. This index is shown in Chart III-2 along with Nutter's index of aggregate physical industrial production. Nutter's index includes production in manufacturing and mining establishments, and in electric and gas utilities.

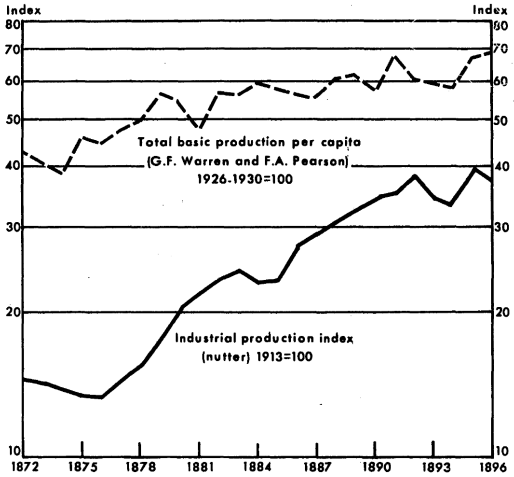

Chart III-2. Indexes of Total Basic Production Per Capita and Industrial Production, 1872-1896.

Source: Total Basic Production Per Capita: Warren and Pearson, Gold and Prices, Industrial Production, Long Term Economic Growth, Department of Commerce, Bureau of the Census, 1966.

Pearson, Gold and Prices, Industrial Production, Long Term Economic Growth", Department of Commerce, Bureau

of the Census, 1966.

output in construction, transportation, and service and trade industries.

The Warren and Pearson index shows an annual increase in per capita basic production of 2 percent per year for the entire period 1873-1896. This index shows uneven growth over the period, with significant declines in production from 1879 through 1882, from 1884 through 1887, and from 1892 through 1894- Although the measures in this series are sensitive to the choice of initial and terminal years, growth seems to have been more rapid in the early years of the period. For example, total basic production per capita increased at an annual rate of 2. percent in the years 1873-1880.

Nutter's index of industrial production increases at an annual rate of 39 *percent over the period 1873-1896. But this index shows a decline from 1895 to 1896, so that if the terminal year chosen is 1895, the annual rate of growth is increased to* 44 percent. Nutter records a decline in industrial production in the years 1873-1876 before a rapid increase through I8 8 3. It can be seen from Chart III-2 that this seven year period of sustained increase was the period of most rapid growth for the entire series.

Further evidence of rapid growth is Gallman's series on commodity output. Gallman's estimates of commodity output are compared in Table II1-3 with the estimates of commodity output derived by Kuznets as a component of his national income estimates. The absolute figures shown in Table III-3 are not comparable with each other. Gallman's estimates are for value added in commodity output and deflated by a price index based on 1879 prices, while Kuznets' figures, based on Shaw's commodity output series, are for finished commodity output and are deflated by a price index based on 1929 prices. The changes in these two series are more nearly comparable.

For the thirty year period 1869-1899, Gallman shows an increase in commodity output of 266 percent. Kuznets shows an increase of 366 percent. Gallman shows the growth in each of the two decades ending in 1879 and 1889 to be equal, but it can be seen from his absolute figures that the most rapid growth of the entire period occurred in the five years from 1879 to 1884. Kuznets' estimates show a rate of increase in the decade ending in 1879 almost double that of the decade ending in 1889, with the rates for the two decades being respectively higher and lower than Gallman's corresponding figures.

While these estimates of commodity output of Gallman and Kuznets differ considerably, they both Conference on Research in Income and Wealth (Princeton Princeton University Press, 1960), pp. 13-67.

108

TABLE III-3

COMMODITY OUTPUT, 1869-1899

Year	Total Value Added in Commodity Output, 1879 Prices (billions of dollars) (1)	Finished Commodity Output, 1929 Prices (billions of dollars) (2)
1869	3.27	3.67
1874	4.30	5.10
1879	5.30	7.60
1884	7.30	9.85
1889	8.66	11.2
1894	10.26	12.8
1899	11.75	17.0
	PERCENT CHANGE	
1869-1879	62	107
1879-1889	63	47
1889-1899	36	52

Source: Col. (1) Robert Gallman, "Commodity Output, 1839-1899," in Trends in the American Economy in the Nineteenth Century, Volume 24, Studies in Income and Wealth (Princeton: Princeton University Press, 1960), Table 1, p. 16. Col. (2) Kuznets, Capital in the American Economy, Table R-21, p. 553.

show very rapid growth throughout the last thirty years of the nineteenth century. And both show rapid growth in the decade of the l870rs, a period that has tradi- ! tionally been known as one of the most severe depressions in U. S. history.

There can be little question but that the deflationary period of 1873-1896 was characterized by very rapid growth. A careful examination of the reports of on-the-scene observers shows that even though the comments describing this period as one of economic stagnation are better known today, many qualified observers described the period as one of remarkable progress. The qualitative estimates we have examined verify the latter view. Although Kuznets' estimates show a more rapid rate of growth than do the others, his estimates of ONP do not seem to be incompatible with the other indicators of growth which have been presented here. Kuznets estimate of GNP will therefore be used to represent economic growth in this period.

Chapter 4

Prices and the Money Supply

Implicit in all of the estimates of the value of output that have been presented is the use of price deflators. It is obvious that the choice of implicit price deflator may have great bearing on the magnitude of growth shown in real terms. It has been stated that a secular decline in prices began in 1873 and continued downward with but few exceptions through 1896. This fact is well known, and yet the specific magnitude and timing of the fall in prices is still uncertain. The extent and reason for the decline in prices was a source of confusion and controversy at the time it occurred. We shall look at the various estimates of the decline in prices ip this period in an effort to ascertain to what extent prices fell in this era of rapid growth.

Before examining these estimates of the decline in prices, let us examine movements in the supply of money. It is in the history of money in this period that we see the great discontent and unrest in this era.

> There has not been introduced into Congress, in either branch, within the memory of many who are here present, a single law upon the currency question but that has had as its aim and desire the creation of a large volume of currency.

Arguments for inflation of the money supply met with stiff opposition. The extent of the feelings engendered by the dispute over the money supply can be seen from the following excerpt of Francis A. Walker's presidential address to the American Economic Associa-tion on December 26, 1890:

> The money supply is not a matter of no consequence. Alike considerable excess and considerable deficiency inevitably become the source of direful ills and woes unnumbered. If of an irredeemable and fluctuating paper currency, that

alcohol of commerce, it can be said that it biteth like a serpent and stingeth like an adder, with equal truth may it be added that strangulation, suffocation, are not words too strong to express the agony of the industrial body when embraced in the fast-tightening folds of contrasting money supply. Unfortunately those who should now be on deck as pilots to guide the ship of state through the narrow sea that separates the whirling gulf of silver monometallism, with a premium on gold and a debased coinage, from the bare and jagged rocks of gold monometallism, with increasing stringency and falling prices, have discredited themselves with captain and crew by denying the very existence of Scylla, and declaring that on that side is broad and open sea.[1] riovements in the money supply from 1870 to 1900 are shown in

[1]Reported in S. McLean Hardy, "The Quantity of Money and Prices, 1860-1891," *Journal of Political Economy*, III (March, 1895), 145* Source: Col. (1) Long Term Economic Growth: 1860-1865 (U. S. Department of Commerce, Bureau of Census, 1966), Series Bill, p. 203. Col. (2) Long Term Economic Growth. Series B116, p. 210.

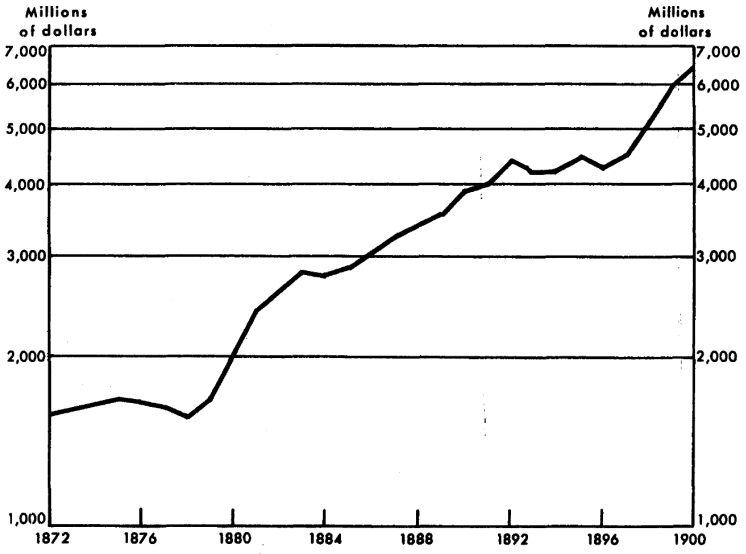

Chart IV-1. Money Supply, 1872-1900.

Source: Long Term Economic Growth.

According to Friedman, there was little practical distinction between demand deposits and time deposits in[2] this period. Time deposits were frequently transferable by check, and demand deposits often paid interest. During the years 1873-1896, the money stock grew at an annual rate of 4.[3] percent for an increase of 168 percent. There was a very rapid increase in the stock of money after 1896. Chart IV-1 shows the growth of the money supply was not smooth in the last thirty years of the nineteenth century.[4]" (4), and (5), Matthew Simon, "U.S. Balance of Payments, 1861-1900," Table 26, p. 696.] "Reported in Taussig, oja. cit., pp. 100-101.

^Friedman and Schwartz, op. cit♦, p. 4.

The year 1879 is a convenient one to divide the monetary history of the U. S. from 1870 through 1900. Before 1879, the big monetary issue concerned the proposed resumption of specie payments. After 1879 the controversy over money centered on the silver question.

Money Supply 1873-1873

The monetary history of the years 1873-1879 is dominated by the financial consequences of the Civil War. From 1862 until 1879, the United States was legally on a pure fiduciary standard, the United States note, or "greenback" standard. The government had greatly inflated the money supply during the Civil War by issuing United States notes, or greenbacks, to help finance the war effort. Because of this inflation of the money supply, combined with the disruption of foreign trade by the war and the financing techniques used by the U. S. Treasury, the government suspended convertibility in February, 1862. From that time until January, 1879, when resumption was accomplished, the value of the greenback with respect to foreign currencies was determined by flexible exchange rates.

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[2]A. D. Noyes, Forty Years of American Finance (New York: Putnam, 1909), p. 18.

[3]Sprague, ojo. cit.. p. 2.

[4]Friedman and Schwartz, o£. cit., p. 5 8. Source: Cols. (l)-(3), (5), (9). Matthew Simon, "The United States Balance of Payments, 1861-1900," in Trends in the American Economy in the Nine-teenth~T?enturv. Table 27, pp. 700-702. Col. (4) Robert F.. Lipsey, Price and Quantity Trends in the Foreign Trade of the United States (Prince-ton: Princeton University Press, 1963), Table A-7, p. 157. Cols. (6)-(8) Historical Statistics, Series U 4-6, p. 53$. Source: Cols. (1) and (3), Long Term Economic Growth. Series B74 and E76, p. 202. Cols. HT

Currency in this period was composed mainly of U. S. notes, national bank notes, and silver and gold coins. The major monetary role of gold in these years was as a source of foreign exchange. Great Britain maintained a gold standard throughout the period of flexible exchange rates in the U. S. Individuals who carried on extensive foreign transactions kept gold balances and increased or decreased these balances to hedge against changes in the exchange rate.

Commercial banks thus kept special deposits denominated in gold dollars as well as regular deposits denominated in greenbacks. The special deposits payable in gold were denominated in terms of pre-Civil War dollars.**" The West Coast quoted prices in terms of these pre-Civil War dollars while the East Coast listed prices in terms of greenbacks*' ' Since the pre-Civil War dollars had a fixed value in terms of the British pound, the bank balances denominated in terms of gold dollars had no fixed value in terms of greenbacks, but fluctuated in value as the greenback-pound exchange rate fluctuated. The U. S. in reality had a dual monetary standard from 1862 to 1879.

The other principle uses of gold were in conjunction with official government transactions. The Treasury made payments on the principal and interest of the national debt in gold throughout the period of inconvertibility. Finally, customs duties had to paid in gold.

National banks could issue notes only after depositing with the Treasury specified government bonds valued at pay equal to 111 percent of the notes issued. After 1874, a further deposit with the Treasury equal to 5 percent of the notes issued was required as a redemption fund. The total amount of national bank notes which could be issued was also determined by law prior to 1875* The money supply increased by less than 6 percent in the seven years from the beginning of 1873 through 1879* The money supply increased from 1872 through 1875• The money supply then declined through 1873, so that it was lower in 1873 than in 1873* This is the second largest secular decline in the money supply on record, and one of only few to have ever occurred. The money supply increased in 1879, but still did not regain the level of 1875. These movements are shown in Table IV-1.

Prior to 1873, public sentiment had generally been in favor of a resumption of specie payments. Although much support in favorof an inconvertible currency had been generated after suspension in 1862,[5] See R. P. Sharkey, Money. Class and Party (Baltimore: John Hopkins University Press, 1959).

[5]S/esley C. Mitchell, Gold, Prices, and Wages Under the Greenback Standard (Berkeley: The Univer-sity of California Press, 1908), p. 14.

TABLE IV-1

MONEY SUPPLY AND MONETARY GOLD STOCK, 1870-1879 (Millions of Dollars)

Year	Money Supply (1)	Monetary Gold Stock (2)
1870	1,331	161
1871	1,470	135
1872	1,598	118
1873	1,612	106
1874	1,626	115
1875	1,693	90
1876	1,666	100
1877	1,640	132
1878	1,564	180
1879	1,690	227

Source: Col. (1) Long Term Economic Growth: 1860-1865 (U. S. Department of Commerce, Bureau of Census, 1966), Series B111, p. 208. Col. (2) Long Term Economic Growth, Series B116, p. 210.

the suspension was regarded as only temporary. In February, 1868, Congress had suspended the retirement of greenbacks, and in the presidential election of that year, the Democratic Party incorporated into its platform a call for the government to pay off its bonds in greenbacks. The Republicans, making a central issue out of this question, opposed this and won the election. In March, 1869, Congress pledged that bonds would be repaid in specie, unless some other means of payment was specifically called for.

The financial crisis of 1873 brought about a change in the attitude of many segments of the population toward resumption. This panic started an inflationary craze on the part of labor, agriculture, and some other groups, and resulted in the reissue of many[6] greenbacks which had previously been retired.

community, and other failures followed. Among the prominent failures was that of Jay Cooke and Co., which was unable to extricate itself in time from its advances to the Northern Pacific Railroad which failed.

[6]Clark M. Warburton, "Variations in Economic Growth and Banking Developments in the United States From 1835 to I8 8 5," *Journal of Economic History*, XVIII (September, 1958), 295^

Although the Crisis of 1873 did not materially delay the advance of railroads, which recovered quickly to continue through 1879 one of the most vigorous periods of expansion in railroad history, it has been commonly thought that the banking community experienced a setback from which it did not fully emerge until after 1879. According to A. D. Noyes, the crisis "left the country's financial and commercial structure[7] almost a ruin."[8] Sprague, however, disputes this view, saying that few banks "failed during the crisis or during the subsequent months and years of depression. And of the failures which did occur hardly any involved serious loss to creditors.

TABLE IV-2

SELECTED BANKING INDICATORS, 1870-1879 (Money Figures in Millions)

Year	Number of Commercial Banks	Total Liabilities or Assets	Total Loans	Total Investments	Number of Suspensions	National Bank Net Profits	National Bank Net Profits as a Percent of Capital Accounts
1879	3,335	3,313	1,507	1,139	37	32	5.1
1878	3,229	3,081	1,561	875	140	31	4.9
1877	3,384	3,204	1,721	852	99	35	5.3
1876	3,448	3,183	1,727	818	59	44	6.4
1875	3,336	3,205	1,748	902	28	53	8.4
1874	3,552	2,891	1,564	732	57	60	8.8
1873	3,298	2.731	1,440	721	41	65	9.8
1872[a]	2,419	2,145	1,123	480	19	58	9.3
1871[a]	2,175	2,003	990	479	10	55	9.2
1870[a]	1,937	1,781	864	470	3	56	9.9

[a]For nonnational banks, total loans and investments are estimated.

Source: Historical Statistics of the United States: Colonial Times to 1957 (U. S. Department of Commerce, Bureau of the Census, 1961). Series X 20-22 and X 25, p. 624, Series X165, p. 636, and Series X198-199, p. 638.

c of Commerce, Bureau of the Census, 1961).

banks, total assets of these banks, total loans and investments, and net profits all increased in 1873 and 1874, although the number of bank suspensions increased sharply in 1873* However, profits in current dollars as well as profits as a percent of capital accounts turned down after 1873 and did not turn up until 1879. The decline in real profits was not as great as shown in Table IV-2 because of the price decline which occurred concurrently. It is clear that while the Crisis of 1873 was not as bad as is commonly thought, it was followed by depressed conditions for banks which did not improve until 1879. It may well be that the opinion of the times concerning economic conditions reflected conditions in banking and finance, where accurate and detailed records were kept.

[7]Report of the Monetary Commission of the Indianapolis Convention~TChicago: 1898), pp. 207-208.

[8]Ibid.

The panic of 1873 combined with subsequent political developments to check the growth of the money supply. In 1874, while many groups were calling for an expansion of greenback issues, a bill was introduced in Congress calling for resumption of specie payments by January 1, 1875. Pressure from these groups favoring expansion of the money supply succeeded in converting this bill into one calling for an increased issue of greenbacks. This revised bill was passed by both Houses of Congress. President Grant vetoed this bill, and it was then followed by the Act of June 20, which fixed the maximum greenback issue at the amount which was then outstanding.

The Republicans lost heavily in the Congressional elections of 1874, and lost control of the House for the first time since i860. In the final weeks of the legislative session, the lame duck Congress passed the Resumption Act of January 14, 1875.

The Resumption Act set the date for resuming specie payments at January 1, 1879. It provided that the Secretary of the Treasury could prepare for resumption by issuing bonds to be sold only for specie, and[9] by using surplus revenues to accumulate gold. The Resumption Act further provided for the removal of the limitation on the total national bank notes in circulation, with the provision that greenbacks would be retired to the extent of 80 percent of the future issues of national bank notes until the sum of greenbacks was reduced to $300,000,000. On May 31, 187$, the provision providing for the gradual reduction of greenbacks was repealed, and the Treasury was directed to reissue those greenbacks which it received in the normal course of business.

Following the Resumption Act in 1875 was the establishment of the Greenback Party. The establishment of the Greenback Party reflected the importance of the currency issue. The Greenbackers' central plank called for the expansion of the money supply. In 1876, Tilden won the popular Presidential vote, but lost the election to Hayes, a Republican. In 1877 the House passed a bill to repeal the Resumption Act, but the measure was defeated in the Senate by one vote.

The net note issues of national banks failed to expand after the removal of the limitation on their issue in 1875> even though legal reserve requirements on national bank notes had also been removed in 1874. In fact, total national bank note issues declined in 1876 and 1877. They expanded after 1887, but still had not regained their level of 1875 by 1830. Barrett attributes this behavior of national bank note issues to the bettering of government credit resulting from the passage of the Resumption Act, which reduced the attractiveness of the terms on which banks could procure the bonds carrying the privilege of note issue.[10] Another reason for this behavior was undoubtedly the increase in the number of bank suspensions in the three year period 1876-1878, although these bank failures were concentrated primarily in non-national banks.

Bank deposits behaved in similar fashion, declining after 1875 through 1878. Legal reserve requirements were continued for deposits when they were ^Barrett, abolished for bank notes in 1874. Bank notes could not be used to meet legal reserve requirements. Only "lawful money," which excluded bank notes, could be used as legal bank reserves. Bank reserves for the period 1873-1880 were as follows:

There was very little increase in legal reserves over this span of years. The adequacy of these reserves, though, was greater than their absolute change would indicate, since after 1874 the reserves which had been tied up with national bank notes were freed. Nevertheless, the lack of growth of commercial bank deposits was at least partly due to the failure of legal reserves to increase. The

[9]Friedman and Schwartz, op. cit., pp. 73-74* Source: Col. (1), (2) Long Term E conomic Growth: 1860-1965, Series Blli, p. 203, and Series Bll67p. 210.

[10]Barrett, oja. cit. , p. 242. Source: Cols. (1)-(3), (5), (9). Matthew Simon, "The United States Balance of Payments, 1861-1900, Table 27, pp. 700-705. Col. (4) Robert E. Lipsey, Price and Quantity Trends in the Foreign Trade of the United States, Table A-7, p. 157. Cols. (6)-(3) Historical Statistics, Series U4-6, p. 533.

bank suspensions which were mentioned above were also partly responsible for the behavior of deposits, but the suspensions themselves may have been partly due to the squeeze on legal reserves.

One source of legal reserves, government issued currency, was directly controlled by the Treasury within the limits set by law, and silver had been demonetized in 1873* Another source of reserves, gold, could be accumulated by banks as they were profitably able to do so. It will be recalled that the price of gold was determined in this period of flexible exchange rates by the fluctuation of the pound-dollar exchange rate, and that Britain maintained a gold standard through the period of inconvertibility in the U. S., so that gold was the equivalent of foreign exchange for U. S. citizens, and also had a variable value in relation to the dollar. The opportunity for banks to increase their reserves profitably by acquiring gold therefore depended on the exchange rate between gold and the dollar.

Gold was at a premium with respect to the greenback during most of the period 1873-1879. There was doubt about the intentions of the government to resume specie payments, and even after it was clear that an attempt at resumption would actually be made, there was doubt about the ability to accomplish this successfully. Ranks were operating in the presence of this uncertainty, and faced the prospect of future loss if they acquired gold reserves at a premium and the resumption was accomplished so that the premium on gold disappeared. Their reluctance to acquire gold at a premium to add to their reserves was later justified when resumption was accomplished and the premium on gold disappeared.

Friedman has pointed out that although many writers have stressed the price of gold as being determined by shifting expectations concerning the prospects of eventual resumption of specie payments, these shifting expectations which affected the demand for and supply of gold could do so only as they altered the[11] dollar-pound exchange rate. The domestic price of gold could only fluctuate narrowly around the dollar-pound exchange rate since all buyers and sellers had the option of dealing in the foreign exchange market.

It is in the foreign trade sector that we must look for an explanation of most of the variations in the dollar price of gold during the period of suspension of specie payments. The pound-dollar exchange rate was determined by the supply of and demand for pounds and dollars.

[11]H. T. Newcomb, "The Decline in Railway Rates: Some of Its Causes and Results," *Journal of Political Economy*. VI (September, 1898), 475.

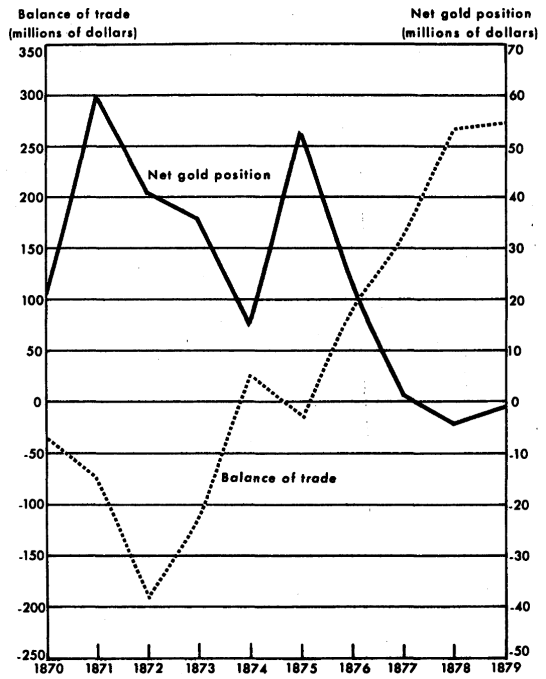

Chart IV-2. Net Gold Position and Balance of Trade, 1870-1879.

Source: Same as Cols. 3, 8, Table IV-3.

127

TABLE IV-3

U.S. INTERNATIONAL COMMERCE, 1870-1879
(Millions of Current Dollars)

Year	Merchandise Exports (Including Sale of Ships (1)	Merchandise Imports (2)	Balance of Trade (3)	Agricultural Exports (4)
1879	731.1	454.7	+276.4	626
1878	715.2	445.8	+269.4	557
1877	623.9	460.3	+163.6	532
1876	661.7	470.0	+ 91.7	435
1875	538.5	549.0	- 10.5	411
1874	611.8	584.4	+ 26.6	389
1873	546.5	661.4	-114.9	454
1872	459.2	648.5	-189.3	396
1871	465.2	535.8	- 70.6	333
1870	412.4	449.0	- 35.6	330

the balance on current account became favorable. This development of a favorable balance on current account created pressure on the pound-dollar exchange rate which tended to increase the value of the dollar relative to the pound.

131

TABLE IV-4

BOND YIELDS IN THE U. S. AND YIELDS ON U. S. PORTFOLIOS HELD ABROAD, 1870-1879
(Percent)

Year	American Railroad Bond Yields	Average Rate of Interest on U.S. Held Foreign Railroad Bonds	New England Municipal Bond Yields	Foreign Government Bonds Held by the U.S.	Adjusted Average Rate of Return on U.S. Held Foreign Portfolio Investments
	(1)	(2)	(3)	(4)	(5)
1879	4.76	4.0	4.22	5.0	6.9
1878	5.10	4.67	4.34	5.1	6.7
1877	5.18	4.43	4.45	5.3	6.4
1876	5.17	2.5	4.59	5.5	6.2
1875	5.46	4.0	5.07	5.6	5.7
1874	5.90	5.5	5.49	5.7	5.3
1873	6.21	7.0	5.55	5.8	4.9
1872	6.19	7.0	5.37	5.9	4.4
1871	6.34	7.0	5.33	6.0	4.0
1870	6.41	7.0	5.44	6.0	4.5

Source: Cols. (1) and (3), Long Term Economic Growth, Series B74 and B76, p. 202. Cols. (2), (4), and (5), Matthew Simon, "U.S. Balance of Payments, 1861-1900," Table 26, p. 696.

foreign speculators who purchased greenbacks while they were at a discount in terms of gold stood to make gains if resumption were accomplished so that the ratio between the price of gold and greenbacks went to par. Gold was at a premium in 1873, and this premium declined irregularly through the rest of the period so that in 1878, just before resumption was accomplished, the premium on gold had almost vanished.

Price of Gold in Greenbacks

and W ages Under the Greenback Standard by Wesley C. Mitchell. Mitchell attributes the high premium of 1875 to the fact that after the attempt to pass a law in 1874 requiring resumption was turned into a law to inflate the greenback issue and was prevented from becoming law only by a presidential veto, no one took the Resumption Act of 1875 seriously.[12] The declining premium on gold after 1875 reduced the speculative profits which could be made even if resumption were assured, and this must have been a factor causing the very small net capital inflow in 1876, and the net outflows during the next three years.

[12]See Rendigs Fels, American Business Cycles—1865-1897 (Chapel Hill: The University of North Carolina Press, 1959), p. 131, and Sprague, op_. cit., p. 109.

As the premium narrowed, it became possible for banks to compete with others for the purchase of

> 15 gold. At about the same time, in 1878, the Bland- Allison Act was passed requiring the. Treasury to purchase and coin a specified minimum amount of silver each year. This also increased the source of possible reserves for commercial banks.

But bank reserves still failed to increase in 1878 and 1879. The Resumption Act of 1875 provided for the retirement of greenbacks to the extent of 80 percent of new national bank note issues. Between January, 1875, and April, I8 7 8, $43 millions of new bank notes had been issued. Accordingly, $35 millions of greenbacks were retired.[13] This reduction in greenbacks resulted in a decline in one important segment of "lawful money" available as legal reserves. This decline in greenbacks apparently offset the increased opportunities for banks to acquire gold and silver for reserves.

It is in this behavior of national bank notes and greenbacks that the reasons for the decline in the money stock in the years from 1875 through 1878 can be seen. The reduction in greenbacks not only reduced that component of the money supply, but it also resulted in a squeeze in reserves, so that a slight decline in the deposit-reserve ratio in these years caused a reduction in commercial bank deposits also. There were new issues of national bank notes in these years, but previous bank note issues were retired in almost twice the amount of new issues, so that there was a net reduction of bank notes in these years.

4.1 Resumption

Successful resumption depended on the ability of the U. S. Treasury to meet demands on it for gold, which in turn depended on the ability of the Treasury to accumulate gold and stem the outflow of gold which had been occurring prior to 1877* As Secretary of the Treasury, John Sherman, took the first deliberate steps to accumulate gold by selling bonds for gold both at home and abroad.

Sherman's actions contributed to the successful resumption of convertibility in 1879, but these efforts alone would not have been sufficient to assure successful resumption. Net gold outflows were substantial in the 1870's until 1877, when inflows of gold almost entirely offset gold outflows (see Table IV-3). In 1878, the year prior to the scheduled resumption, a net inflow of gold was recorded for the first time in the decade of the 1870's. This reversal in the flow of gold was due to a number of factors. Part of the inflow of gold resulted from the Treasury's actions to accumulate gold, and was thus actively sought. The Treasury's actions further contributed to the reversal of the gold flows to the extent that its actions inspired confidence abroad that the U. S. was really determined to resume specie payments and so made foreigners willing to hold claims denominated in greenbacks instead of insisting on payment in gold.

achieved its second favorable trade balance during the period of inconvertibility, although the balance on current account was still negative (see Table IV-3). In 1877 the favorable trade balance increased and the balance on current account became positive. With this in 1877 came the halt in the outflow of gold mentioned above. The favorable balance on current account increased in 1878 and brought with it an inflow of gold.

These changes in the current account balance contributed not only directly, but also indirectly to the change in gold flows. It has been pointed out that changes in the supply of and demand

[13]Margaret 9. Myers, The New York Money Market (New York: The Columbia University Press, 1931), pp. 290-91.

for foreign exchange were the major forces determining the price of gold in terms of greenbacks. The movement from a deficit on current account to a surplus constituted a relative increase in the demand for greenbacks by foreigners. This resulted in a progressive appreciation of the greenback in terms of gold, or what is the same, in a declining premium on gold, as we have already seen. The decline in the premium on gold meant that gold was an increasingly cheaper and advantageous way to hold funds for domestic use. The increased willingness and ability on the part of people within the U. S. to hold gold meant that it was less necessary for gold to flow abroad to seek profitable employment Friedman attributes the changes in foreign trade and exchange rates to relative movements in foreign and domestic price levels, as explained by the purchasing-power-paritv theory of exchange rates. ° Agricultural exports from the T J. S. in response to crop conditions in Europe also were a significant factor affecting the U. S. balance of trade and the gold-greenback exchange rates in 1877 and 1878, and played the major role in assuring the success of the U. S. in maintaining convertibility in the period immediately following the initiation of resumption, as we shall see.

Money Supply 1879-1896

Resumption of specie payments took place as scheduled on January 1, 1879. Under the regime of flexible exchange rates the money stock was largely subject to the discretionary control of the government, but under the gold standard the money stock was largely independent of discretionary controls and was ultimately whatever it had to be to accomodate the external forces and needs of international trade.

Changes in the monetary gold stock are shown in Table IV-5 and very rapidly through 1883. The annual rate of increase of the money supply in these five years was about 11.[14] percent. This extraordinarily rapid increase in the money supply was broken by a decline of almost 6 percent in 1884. The increase in the money supply resumed again in 1885 and continued through 1892, but at the slower rate of about 6 percent per year. The money supply then declined by a little more than that amount in 1893 before increasing slightly in the following two years so that the money stock in 1895 was only a little higher than in 1892. After declining again in 1896, the money supply began a long term increase that extended on past 1905.

[14]Comparable with earlier figures for Cols. (1)- Source: Historical Statistics. Series X 20-22 and X25, p. 024, Series Xl65, p. 6 3 6, and Series X-198-199, p. 63S.

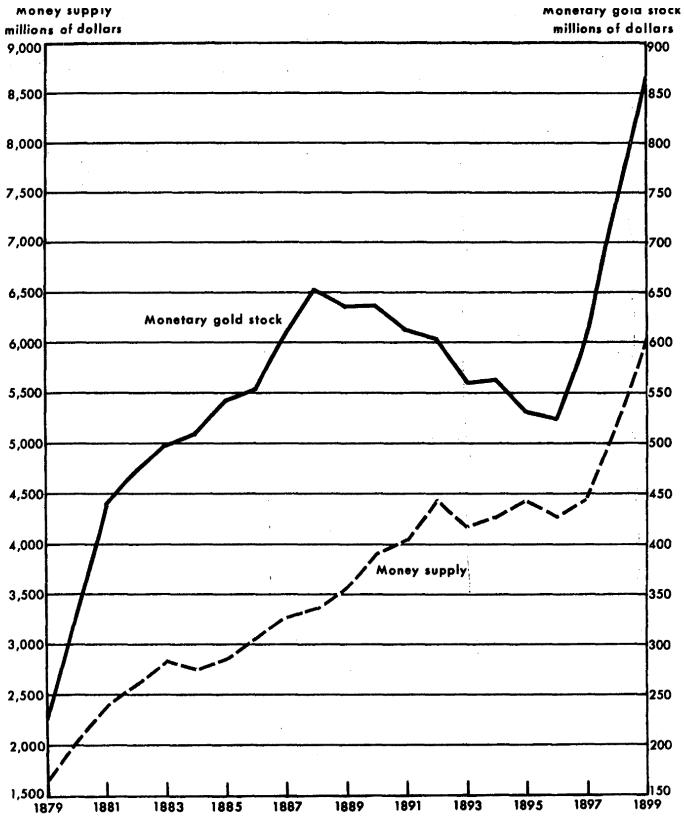

Chart IV-3. Monetary Gold Stock and Money Supply, 1879-1899.

Source: Same as Table IV-5.

TABLE IV-5

MONEY SUPPLY AND MONETARY GOLD STOCK, 1879-1899
(Millions of Dollars)

Year	Money Supply (1)	Monetary Gold Stock (2)
1879	1,690	227
1880	2,009	330
1881	2,399	440
1882	2,591	472
1883	2,806	498
1884	2,766	510
1885	2,841	542
1886	3,082	557
1887	3,277	611
1888	3,364	653
1889	3,547	637
1890	3,903	638
1891	4,026	615
1892	4,455	604
1893	4,195	560
1894	4,228	562
1895	4,467	531
1896	4,275	527
1897	4,491	604
1898	5,142	741
1899	6,022	869

Source: Col. (1), (2) Long Term Economic Growth: 1860-1965, Series B111, p. 208, and Series B116, p. 210.

The rapid increase in the money supply in the years 1879-1883 can be explained through the classical gold standard mechanism. Prior to 1879, there was doubt about the ability of the U. S. to achieve succussful resumption. As we have seen, the outflow of gold was stopped in 1877 and an inflow of gold began in 1878 due to a number of factors, among them being the development of a favorable balance of trade beginning in 1876, and the deliberate action taken by John Sherman as Secretary of the Treasury to accumulate gold. Successful resumption of convertibility was assured by gold inflows in 1879 and 1880 due to circumstances entirely unrelated to any type of deliberate policy or action.

Agricultural products dominated American exports throughout the entire period 1873-1896. In 1879, poor crop harvests occurred throughout Europe because of late frosts and torrential rains. The harvest of 1879 was the worst that Oreat Britain had experienced in the nineteenth century up to that time.[15] Harvests in the U. S. in 1879, in contrast, produced bumper crops. Although harvests were somewhat better in Europe and the rest of the world in 1880, they were still poor, while another bumper crop was produced in the U. S. The result was a great boom in exports of. foodstuffs, and thus in exports in general from the T J. S. in these years. Harvests in both the U. S. and abroad were generally poor in 1881, but this meant that there was a ready market abroad for U. 3. exports of foodstuffs. As Table IV-6 and Chart IV-4 indicate, this increase in exports resulted

[15]Francis A. Walker, "The Free Coinage of Silver," *Journal of Political Economy*. I (March, 1893), 170.

in a great inflow of gold in 1830 and 1881. These favorable conditions for agricultural exports did not persist after 1831, and a decline in exports combined with an increase in imports to produce a negative balance on current account in 1832 and 1883. Nevertheless, there was a small inflow of gold in these two years.

The sharp increase in exports and accompanying large increase in gold inflows resulted in the rapid The decline in the money supply in 1884 came as a result of the financial panic which began in May of that year. As in the crisis of 1873, the involvement of banks in the financing of unsuccessful railroads figured in the panic of I8 8 4. In I8 8 3, railroads involving 1,990 miles of track and capital of $108,470,- 000 went into receivership. In 1884, railroad receiverships involved 11,038 miles of track and capital worth $714,755,000.2® financial panic was further intensified by the outflow of frold which occurred as foreign investors reacted to the railroad troubles by divesting themselves of their securities holdings in U. 3. railroads (see Table IV-6). Fels and Sprague regard this outflow of gold caused by the sale of foreign-owned securities as the ma.jor cause of the panic.[16] The financial panic of 1834 was relatively mild and of short duration. Although the number of bank failures almost doubled in 1834, the total number of banks increased. The total assets, loans and investments also increased, as did net bank profits (see Table IV-7).

142

TABLE IV-6

U. S. INTERNATIONAL COMMERCE, 1879-1899

Year	Merchandise Exports (Including Sale of Ships (1)	Merchandise Imports (2)	Balance of Trade (3)	Agricultural Exports (4)
1899	1,227.9	704.1	+523.8	788
1898	1,232.9	622.2	+610.7	860
1897	1,051.3	772.4	+278.9	787
1896	883.3	787.5	+ 95.8	672
1895	807.9	739.3	+ 68.6	551
1894	892.7	661.5	+231.2	580
1893	862.8	875.1	- 12.3	626
1892	1,051.4	835.7	+215.7	720
1891	910.2	857.2	+ 53.0	741
1890	882.3	845.4	+ 36.9	639
1889	763.2	798.0	- 34.8	606
1888	717.1	775.4	- 58.3	497
1887	735.2	741.5	- 6.3	536
1886	697.9	680.6	+ 17.3	539
1885	756.9	618.5	+138.4	506
1884	754.2	715.1	+ 39.1	552
1883	843.9	737.6	+106.3	601
1882	767.8	739.1	+ 28.7	579
1881	919.4	655.5	+263.9	657
1880	852.7	681.3	+171.4	747
1879	731.1	454.7	+276.4	626

[16] Ibid., p. 106.

The period of 183'[17] to 1890 was one of relatively few unusual features. As far as social and political unrest was concerned, these years were tranquil in comparison with other years in the period 1873-1896. The sustained and regular increase in the money supply after 1834 through 1892 apparently slowed or even reversed slightly the decline in prices. This must have quelled somewhat the cries for inflation of the money supply, although the silver interests remained active in their campaign to inflate the money supply through the monetization of silver.

147

TABLE IV-7

SELECTED BANKING STATISTICS, 1879-1899
(Money Figures in Millions)

Year	Number of Commercial Banks	Total Liabilities or Assets	Total Loans
	(1)	(2)	(3)
1899	12,459	10,679	5,689
1898	12,163	9,218	4,976
1897	12,079	8,402	4,596
1896[a]	12,112	8,048	4,615
1896[b]	9,469	7,554	4,231
1895	9,818	7,610	4,269
1894	9,508	7,291	4,085
1893	9,492	7,192	4,369
1892	9,336	7,245	4,337
1891	8,641	6,562	4,031
1890	8,201	6,358	3,854
1889	7,244	5,945	3,478
1888	6,647	5,471	3,161
1887	6,170	5,193	2,943
1886	4,338	4,542	2,434
1885	4,350	4,427	2,272
1884	4,113	4,221	2,261
1883	3,835	4,208	2,234
1882	3,572	4,031	2,051
1881	3,427	3,869	1,902
1880	3,355	3,399	1,662
1879	3,298	3,313	1,507

[a]Comparable with later figures for Cols. (1)-(4).

[b]Comparable with earlier figures for Cols. (1)

The mighty protest which was to arise and to be repeated from land to land, through a score of years, against the repudiation of silver, had not been intimated at this time. Some committee man, or some committee men, ran the pen through the silver dollar; and the thing was done. Few congressmen outside of the committee knew that any vital change was impending. The measure passed through the usual course; the bill was duly "read" the required number of

[17]Dickson H. Leavens, Silver Money (Bloomington, Indiana: Principia Press, Inc., 1939), p. 54•

> times; and without a debate and even without the attention of members generally being called to this feature, the demonetization of silver was effected.

Just before the "crime of 1873" became law in the United States, silver had also been demonetized by Germany. At about the same time rich new mines in the western U. S. were discovered and their production increased the supply of silver. The increased supply and decreased demand for silver resulted in a decline in prices that began in 1872, before the demonetization of silver. But it was not until 1875 that silver producers recognized that the privilege of minting silver, which they had failed to exercise before, would have been profitable if it had still been available.

This brought forth cries from the silver interests charging that the Act of 1873 was a conspiracy against them. They demanded that the privilege of free and unlimited coinage of silver at the ratio of 16:1 be granted them. The silver interests were joined in their demands by groups of farmers who argued that an increase in the money supply would raise prices and reduce the real burden of their debt. Members of the newly formed Greenback Party also joined the silver interests, viewing this as an alternative to the increased issue of greenbacks as a way of inflating the money supply.

Walker contended that these groups, because of their direct interest in the silver question and their concentration of power in certain geographical areas which gave them disproportionately great power in the Senate, were able to wield power and exert influence in much greater proportion than their numbers.[18] In any case, these interests succeeded in getting a number of silver bills introduced in the House in 1876. The Senate took no action on these bills. In 1877 the House passed a bill providing for, among other things, the free coinage of silver. The Senate amended this bill by striking out the free coinage clause. The House accepted the Act as it was amended by the Senate and it was sent to President Hayes, who promptly vetoed it. The bill was then passed over President Hayes' veto and the Bland-Allison Act became law February 26, 1876.

The Bland-Allison Act provided for the purchase of silver and its limited coinage by the Treasury in place of free coinage. Minimum and maximum figures were set on the amount of silver the Treasury could purchase. In practice, the amount of silver purchased by the Treasury tended toward the lower limit. Even so, silver purchases by the Treasury under the Bland- Allison Act accounted for about 60 percent of all American silver production during the period in which the Act was in force, and silver coined in this twelve year period was equal in value to about two-thirds of the gold coined in this period.[19] The continued efforts of the silver lobby culminated in the passage of the Sherman Silver Purchase Act in 1890. The Sherman Silver Purchase Act repealed the Bland-Allison Act and called for silver purchases by the Treasury of almost twice the amounts permitted under the Bland-Allison Act. It was the passage of this Act, more than anything else, which caused the big increase in the outflow of gold in 1891 as foreign-owned American securities were returned to the U. S. because of the doubt this Act cast on the intentions of the U. S. to maintain a gold[20] standard. This outflow of gold resulted in a further decline of the Treasury's gold reserves, which had previously been reduced by smaller gold outflows in 1889 and 1890. Banks also lost gold and there was a sharp increase in bank failures in 1891* As a result of these conditions, there was a marked reduction in the rate of growth of the money supply in 1891.

The outflow of gold was stopped abruptly, but only temporarily, in 1892. Grain crops in Europe failed during the harvest of 1891, while U. S. crop harvests were among the best on record up to that time. The result was a substantial increase in exports as agricultural exports increased sharply

[18] Friedman and Schwartz, oj£. cit., pp. 106-107.
[19] Ibid., p. 108.
[20] Leavens, op. cit., p. 76.

in the latter half of 1891 and 1892. The money supply reacted to these conditions and the rate of increase was greater than in 1891.

The improvement in financial conditions that occurred in 1892 was due to fortuitous circumstances of a temporary nature and could not have been expected to continue. In 1893 a series of events occurred which started the great financial crisis that persisted through 1896.

Even though there was no net outflow of gold from the U. S. in 1892, foreign owners of American securities, largely railroad securities, had continued to divest themselves of their holdings. Had it not been for the big increase in American agricultural exports, a large outflow of gold would have resulted. Repatriation of these foreign-owned securities occurred, as we have seen, partly because of doubt about the future maintenance of a gold standard by the U. S. Another event which must have diminished the confidence of foreign investors was the formation of the Populist Party in 1892, whose platform called for, among other things, the free and unlimited coinage of silver.

Reinforcing these incentives to return American securities was the increasing difficulties of many railroads. As Table IV-8 shows, there was a marked increase in railway receiverships in 1892. In 1893. an even greater increase in receivership occurred, providing further incentive for foreigners to divest themselves of their holdings in American railways.

154

TABLE IV-8

RAILWAY RECEIVERSHIPS AND FORECLOSURES, 1880-1897

	Receiverships		Foreclosures	
Year	Miles	Capital	Miles	Capital
1897	1,537	$ 92,909,000	6,674	$ 517,680,000
1896	5,441	275,597,000	13,730	1,150,377,000
1895	4,089	369,075,000	12,831	761,791,000
1894	7,052	395,791,000	5,643	318,999,000
1893	29,340	1,781,046,000	1,613	79,924,000
1892	10,508	257,692,000	1,922	95,898,000
1891	2,159	84,479,000	3,223	168,069,000
1890	2,963	105,077,000	3,825	182,495,000
1889	3,803	99,664,000	2,930	137,815,000
1888	3,370	186,814,000	1,596	64,555,000
1887	1,046	90,318,000	5,478	328,181,000
1886	1,799	70,346,000	7,687	374,109,000
1885	8,386	385,460,000	3,156	278,494,000
1884	11,038	714,755,000	710	23,504,000
1883	1,990	108,470,000	1,354	47,100,000
1882	912	39,074,000	867	65,426,000
1881	110	3,742,000	2,617	127,923,000
1880	885	140,265,000	3,775	263,882,000

Source: H. T. Newcomb, "The Decline in Railway Rates: Some of Its Causes and Results," Journal of Political Economy, VI (September, 1898), 475.

The financial panic did not begin until May 3, 1893* The panic began when a highly regarded stock market favorite failed. This failure generated a loss of confidence in the financial sector on the part of many individuals, and runs on commercial banks soon followed, causing banks to lose much of their currency reserves. These runs forced many banks to close, with the result that bank suspensions in 1893 rank second in number only to those of 1929.

The net result of all these problems was a heavy gold drain that began in the early part of 1893• An announcement in June that the government would ask for the repeal of the Sherman Act slowed the outflow for a short time, but the failure of |the Erie Railroad in July precipitated a steep decline in the stock market, which in turn touched off a second run on banks.[21] More suspensions followed before banks throughout the country temporarily restricted convertibility of demand deposits into currency.

The 6 percent reduction in the money supply in 1893 can be explained in the light of the financial panic. This big decline was the subject of further political agitation after 1893, as silver and agrarian interests continued to call for the free coinage of silver and inflation of the money supply. A further reason for unrest on the part of the silver interests at this time was the abolishment of the privilege of free coinage of silver bv the Indian.mint, which re-^ suited in a sharp drop in the price of silver. " Coming soon after the passage of the Sherman Act, this Act received the blame for producing the chaotic conditions involving the railroads and the banks in 1893* This resulted in the repeal of the Sherman Act in October, 1893, after the government[22] announced in July that it would seek this action. The repeal of the Sherman Act had the result of pleasing the anti-silver forces, but intensified the dissatisfaction of the silver and agrarian interests.

Financial conditions improved somewhat in 1894, then deteriorated again in 1895. Speculation[23] against the dollar accompanied the continued political agitation in that year, and the gold outflow which had abated in 1894 again picked up in tempo. In 1896, the free silver advocates succeeded in nominating William Jennings Rrvan as the Democratic candidate for President. The apparent increase in strength of the free silver forces led to additional outflows of gold, and the loss in bank reserves was accompanied by a high number of suspensions.

These events were mirrored by the behavior of the money supply. After increasing in 1894 and 1895, the money supply again fell in 1896. The defeat of Bryan in 1896 marked the end of the silver issue, and in 1897 gold inflows occurred. The pressure on the dollar then ceased completely.

Underlying the slow growth of the money supply in the years 1879-1896 was the slow increase in the gold stocks of the U. 5. Between 1871 and 1876, Germany, the Latin Ttonetary Union (France, Italy, Belgium, and Switzerland), the Scandinavian Union (Denmark, Norway, and Sweden), and the Netherlands adopted the gold standard, as well as a few other countries. This constituted a big increase in the, world monetary demand for gold without a corresponding increase in supply.

At this time new gold discoveries were made in South Africa, Alaska, and Colorado. Mr. Morton Frewen wrote in the December, 1893, National Review that "a single camp in the Transvaal, unknown seven years since, is now producing each month as much gold as either the United States or Australia. These discoveries combined with the introduction of the potassium cyanide method of refining gold to greatly increase world gold production. The full impact of increased world gold

[21] Retail Prices and Wages. 52nd Congress, 1st Session, Senate Report 986, 3 parts (Washington, D.C., 1892), Wholesale Prices, Wages, and Transportation, 52nd Congress, 2nd Session, Senate Report 1894, 4 parts ('Washington, D. C., 1893)*

[22] Retail Prices and Wages, o p. cit.

[23] Fora discussion of price data for the nineteenth century see Ethel P. Hoover, "Wholesale and Retail Prices in the Nineteenth Century," *Journal of Economic History*, XVIII (September, 195677" 298-316• 33s. M. Hardy, "The Quantity of Money and Prices, 1860-1891," *Journal of Political Economy*, III (March, 1895), 145..... .....

production was not felt in the U. S. until after 1896, when increases in the monetary gold stock succeeded in reversing the fall in prices which had occurred since 1873*

4.2 The Decline in Prices

Once of the few items of general agreement by contemporary observers was that prices declined through out most of the period 1873-1896. But while everyone recognized the presence of deflation, few people documented the extent of the decline in prices. It was the debate over the extent of the deflation which motivated the Senate Committee on Finance to undertake an investigation which had as its object the collection of data showing trends in prices and wages during the years 1840-1891. The basic data assembled by the Committee, together with the resulting price indexes constructed by Roland P. Falkner, were published in the "Aldrich Reports.

In the report, Senator Aldrich stated that:

> One of the principal causes that led to adoption of the resolution was undoubtedly the existence of a constant demand from legislators and economic students for reliable statistics in regard to the course of prices and wages in the United States. The absence of such statistics has led to a constant and indeterminable dispute over facts in every economic discussion. Without them it has been impossible to judge even with approximate accuracy of the progress of the people of the country and the changes which have taken place from time to time in their condition.

The Aldrich Reports did little to settle any controversies. As soon as they were published, Falkner's price indexes were vigorously attacked by critics who questioned their technical adequacy. Notable among these critics was Wesley C. ,'Mitchell, who later reworked some of the basic data from the Aldrich Reports for Gold, Prices, and Wages Under the Greenback Standard. In spite of the doubts cast on Falkner's indexes, the basic price data from the Aldrich Reports provided the basic source material for price indexes which were constructed later.

The prices covered by the Aldrich Reports are mostly those of agricultural products and raw materials. Consequently, price indexes covering periods in the nineteenth century are heavily weighted in these products.[24] To the extent that prices for these goods are more flexible than prices of non-agricultural finished goods, these price indexes overstate the decline in prices.

Frbny

[24]And rews, "The Bimetallic Committee," op. cit., 3 2 1.

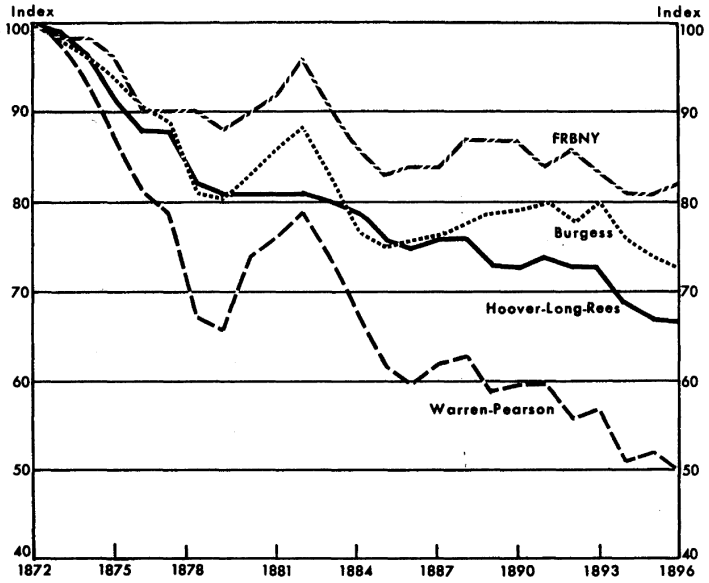

Chart IV-5. Comparison of Four Price Indexes, 1872-1896.

Source: Warren and Pearson, Gold and Prices, and Historical Statistics.

Statistics.

Burgess Cost-of-Living index for the years 1830-1839. The Burgess index is derived from price movements of ten basic foods important in wage earners' consumption patterns, and adjusted to account for all costs on the assumption that other prices fluctuated in a manner similar to that of the ten basic foods. The Warren and Pearson Wholesale Price Index is based largely on quotations of prices relating to New York City and taken from newspapers.

It can be seen from Chart IV-5 that these four price indexes differ concerning the magnitude of the decline in prices in the years 1873-1896. They are in general agreement, on the other hand, concerning the timing of the change in prices. They all indicate that the decline in prices proceeded:in an irregular fashion. The FRFNY and Warren and Pearson indexes show an increase in prices in 1872, while the Burgess and Hoover-Long-Rees indexes show a decline in prices. They all indicate a steady drop in prices after 1872 to a low point 1879. From 1879 three of the indexes indicate prices rising to a peak in 1832 before beginning to decline again. The Hoover-Long-Rees index shows no change in prices from 1879 through 1832. Two of the indexes show the decline from 1832 extending through 1836, while the other two show the decline ending in 1835, and a very slight increase in prices in 1836. All indexes also show an increase in prices from 1836 through 1833, with the exception of the Burgess index which shows no price change from 1837 to 1833.

The indexes differ somewhat in their timing of price changes from 1833 to 1891. All four indexes again show roughly similar movements from 1891 through 1900. The FR3NY index shows the trough of the entire twenty-four year period coming in 1895, while the other three show the low point coming in 1896. After 1896 all indexes show a steady increase in prices through 1900, with the exception of the Warren-Pearson index which shows no change in 1897 before increasing through 1900.

The Warren-Pearson price index shows the greatest decline over the entire period 1873-1896. According to this index, prices fell by half during these twenty-four years, or at an average an-

nual rate of 2.[25] percent. The FRBNY index shows the least decline, a decline of 13 percent. This index shows a decline in prices of 19 percent through 1895, when this index registered its lowest point. The Burgess index and the Hoover-Long-Rees indexes occupy an intermediate position. The Burgess index declines by 27 percent and the Hoover-Long-Rees With the exception of the FRBNY index, which shows no change in prices from 1876 to 1873, the years 1873-1879 form a period of an uninterrupted decline in prices. This is the longest period of consecutive declines in the price level in the entire twenty-four year period. The decrease in prices over these seven years was greater than in any other seven year period within the span of 1873-1896. Only the steady decline in prices from 1832 to 1835 or 1836 might have proceeded at an average annual rate greater than that of 1873-1879* Which of these two periods had the most rapid rate of decline depends upon which price index is used to measure the decline.

According to the FRPNY index, the decline in prices during the years 1873-1879 was 12 percent, while prices declined by 13 percent from 1832 to 1835. The average annual rates of decline are 1.[26] percent and 34 *percent respectively. The Hoover-Long-Rees index, on the other hand, indicates the opposite. It shows prices declining in the earlier period at an average annual rate of 3 percent, and an average annual rate of 1.*[27] *percent in the later period. The Burgess index conforms with the FRBNY index in indicating a more rapid rate of decline from 1832 to 1836, but differs in the magnitude of the decline in both periods. The Warren-Pearson index shows the average rate of decline to be about the same in both periods. This index gives average annual rate of decline for the years 1873-1879 as 57* percent, and the corresponding figure for 1833-1836 as 5*3 percent.

It will be recalled that the most rapid growth of the entire period of deflation came in the years 1873-1879* These years were also, as we have just seen, the longest uninterrupted decline in prices, and one of the two periods of the most rapid rate of decline in prices. The years 1833-1836 form the second longest span of steadily declining prices, with the rate of decline being about the same or a little more rapid than in the years 1873-1879. Yet the period 1833-1836 was characterized by relatively slow growth.

Contemporary observers differed in their assessments of the causes of the decline in prices, and their comments concerning this reveal much confusion. In general, these observers were adherents of a simple quantity theory of money, and attributed changes in prices to changes in the quantity of money. According to S. IIcLean Hardy:

> Much of the prevalent monetary discussion of the day includes or touches upon the subject of prices, and almost invariably when that subject is mentioned there comes to the surface, in one form or another, the theory that the main element which influences prices today is the quantity of money in circulation.[28]

To these contemporary observers, the term money was synonymous with currency. Demand deposits were too recent an innovation for their role as money to have been widely recognized. Demand deposits were twice as large as currency in 1896. Not surprisingly, the quantity theory, as represented by Fisher's equation of exchange with money defined as currency, was attacked in many quarters.

Under the gold standard which prevailed after 1873, variations in the supply of gold occupied a position of primary importance in causing fluctuations in the money supply. Quantity theorists

[25] [chart data, omitted]

[26] Simon Newcomb, "Has the Standard Gold Dollar Appreciated?" *Journal of Political Economy*, I (September, 1893), 507. ..... .

[27] Laughlin, ojq. cit., 329. ^°Ibid., 324.

[28] Hardy, oja. cit., 166-63.

thus tried to explain the decline in prices in terms of the growth of the supply of gold. But many of those supporting the quantity theory did hot understand it, and the same is true for those who attacked the quantity theory.

> In contending that gold has immensely appreciated since 1873. and that thi s, with the fall of general prices which it involves "(italics mineTT is a terrible evil, our Western friends are perfectly right. To this extent the facts, the logic, the ethics of the situation are with them. 34

This statement was part of the vigorous debate on the question of whether or not the appreciation of gold had caused the decline in prices, or the decline in prices had caused the appreication of gold. N. G. Pierson quoted a newspaper as saying that "the appreciation of gold has intensified the fall of prices."[29] Taussign recognized the fallacies in this argument and said, "Of course the appreciation of gold is not the cause of the fall in prices, it is the fall."[30] David A. Wells also recognized this, and pointed out that the question of whether prices had fallen or gold had appreciated had no meaning, since they were the sane. Wells felt that the real question was whether prices had fallen and gold had appreciated because of forces affecting the supply of gold, or because of forces affecting the supply of goods.3?

But even Wells' question was partly irrelevant. The appreciation of gold and decline in prices are simply different sides of the same coin. Fisher's equation of exchange, ?IV = PT, shows that prices are a result of three variables, the stock of money, velocity, 2 % . G. Pierson, "Index Numbers and Appreciation of Gold," Economic Journal, V (September, 1$95), 333-34.

and the physical volume of transactions. Whether the supply of goods had been increased or the supply of gold curbed, the equation of exchange showed that the way to increase prices without curbing the supply of goods was by increasing the money supply, assuming velocity to be an autonomous variable and relatively constant, as Fisher assumed.

Opponents of the quantity theory also failed to recognize that it showed that the price level is determined by the mutual interaction of the money supply and the output of goods. In their attack on the quantity theory, they tried to show in the main that prices had fallen because the cost of producting goods had fallen, and that therefore the supply of money had nothing to do with the price declines. Simon Newcomb, for example, said,

> It is conceded by both sides, or at least by the intelligence of "both sides, that the fall in prices which has opened the question has been due wholly to improvements in production and transportation with which the currency has had nothing to do. Hence this cheapening should not be charged to the currency in any way.3°

> The extent to which producers have been driven by the fierce competition since 1873 to cheapen production leads to the inquiry how far the fall of prices can be accounted for by influences connected solaly with commodities, and not with gold.-'[31] Laughlin denied that the scarcity of gold had anything to do with the falling prices. The decline in prices came about solely from conditions affecting the supply of goods by making costs of production and distribution less.

[29]Ibid.,162.

[30]Ibid.

[31]Weslev C. /litchell, "The Mew Gold and the Fall of Prices," *Journal of Political Economy*, V (December, 1896), 154-55-

yards @ 5t per yard = $10,000 Hardy then states, "Doubling the quantity of goods,

therefore, does not necessarily require any increase in the media necessary to exchange them.[32] Now it would be hard to find a better example to illustrate the contention that failure of the money supply to grow in step with increases in output could result in a lower price level than that of Hardy's. Intending to demonstrate the flaws in the quantity theory, Hardy, without realizing it, did ^ust the opposite, and presented an example supporting the contention of the quantity theorists that failure of the money supply to keep up with increased production had resulted in the decline in prices.

> The growth of clearing house transactions means the growing use of checks,;drafts and the like for settlement of accounts: it means the unprecedented growth of a system of bank-deposit currency, the development of an instrument for doing money-work without the use of actual money. Hardy recognized that demand deposits performed the same functions as currency, but he still failed to realize that they could also affect prices.

Wesley C. Mitchell was guilty of the same error. Mitchell contended that the scarcity of gold could not be blamed for the fall in prices after 1873* There had been a scarcity of gold, he admitted, but gold production had increased after 1890 without reversing the trend of falling prices.[33] Ironically, Hdtchell wrote this in December, 1896, at the very end of the decline in prices.

Francis A. Walker wrote an article defending the quantity theory which appeared in the Quarterly Journal of Economics in July, 1895.[34] In this article Walker argued that prices had declined even though the money supply had been increasing because the work to be done by money had been increasing by an even greater amount.

In /larch, 1896, Mitchell answered Walker's[35] article and attacked the quantity theory in the Journal of Political Economy.4[36] Mitchell, just as Laughlin and Hardy had done earlier, pointed out that demand deposits also performed the same work as money, so that the emphasis on gold of the quantity theorists was misplaced.

> In the first place an increased supply of goods does not necessarily require any increase in thie media of exchange. The total amount of the instruments of exchange required to transact a community's business is not fixed by the amount of the goods to be exchanged, but by the amount multiplied by the price. It takes no more money to exchange 2000 tons of steel at twenty dollars a ton, than to exchange 1,000 tons at forty dollars. Thus the total volume of good exchanged may increase enormously without requiring any larger circulating medium.<

I'itchell, just as Hardy, illustrated his case against the quantity theory with an example showing that, with velocity constant, failure of the money supply to increase as the quantity of output increases would result in a lower price level, just as the quantity theorists had been saying. Nevertheless, TMitchell claimed that the quantity theory could not explain the change in prices resulting from an increase in output due to lower costs of production if the increase does not result in an increased demand for-money. The criticisms of the quantity theory were useful in that they pointed out that demand deposits also served as money. As the quantity theory was then stated, it did not consider the largest component of the money supply. Fisher responded to this criticism by adjusting the equation of exchange to take account of the role of demand deposits.

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[32] Francis A. Walker, "The Quantity Theory of Money," *Quarterly Journal of Economics*. IX(July, 1895)> 319-27.

[33] Mitchell, "The Quantity Theory of the Value of Money," qj>. cit., 154-55*

[34] Ibid.

[35] Ibid. , 155.

[36] Irving Fisher, "Recent Changes in Price Levels and Their Causes," *American Economic Review*, I (April, 1911), 37-45.

Put as we have seen, the other criticisms of the quantity theory were confused. And as we have also seen, many of the defenders of the quantity theory were also confused, "bst of the confusion resulted from the attempt to dichotomize the reasons for the price decline into the money side or the commodity side. They attributed the decline in prices to either changes in the money supply, or changes in the supply of commodities.

The reasons for the price decline can be seen by examining the movements in the money supply in relation to those of output. Chart IV-6 shows these movements. The money supplied increased very little in the years 1873-1879, while output was growing at a very rapid rate. The years 1879-1833 saw a reversal of these relative rates of growth, with the money supply increasing at a more rapid rate than output, whose rate of growth had slowed down. The money supply, after declining in 1834, increased through M oney supply GNP continued to increase after 1892 through 1896 while the money supply failed to increase in these years.

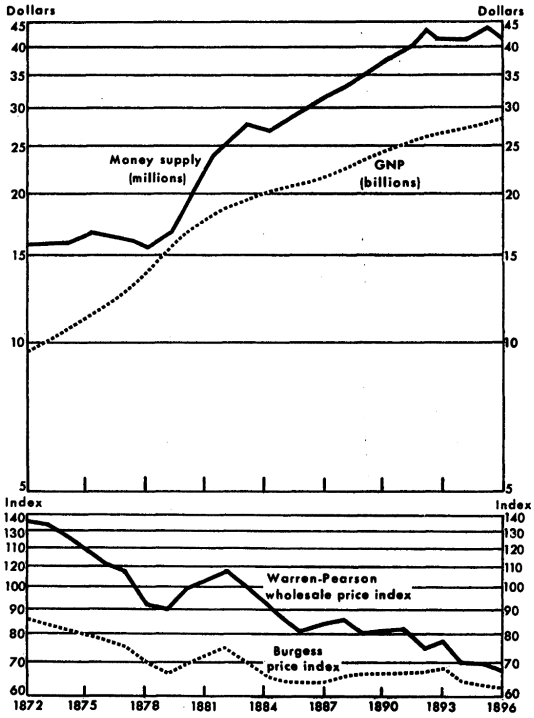

Chart IV-6. Money Supply, Gross National Product, and Two Price Indexes, 1872-1896.

Source: Money Supply, same as Chart IV-1; Gross National Product, same as Chart III-1: Price Indexes; Warren and Pearson, Gold and Prices, and Historical Statistics.

Chart IV-6 also shows the movement of prices as indicated by the Burgess and Warren-Pearson price indexes. It is clear that the failure of the money supply to increase in 1873-1879 while output was increasing rapidly was transformed into a very rapid decline in prices. From 1879 to 1882, the growth of the money supply at a more rapid rate than that of output produced the increase in prices of these years.

The reasons for the sharp decline in prices from 1832 to 1835 or 1886 are not as obvious. Apparently a decline in velocity occurred which was great enough to produce the substantial decline in prices even though the money supply increased at a slightly more rapid rate than output. The financial panic of 1834 and the decline in the money supply which accompanied it also contributed to the decline in prices.

The steady growth in the money supply after I 8 8 4, outstripping the growth of output through 1892, resulted in either a slowdown or a halt in the price decline from 1886 through 1892. The failure of the money supply to increase from 1892 to 1896 while output continued to increase resulted in the renewal or increase of the decline in prices.

It is thus easily seen that prices declined over the period 1873-1896 because of the failure of the money supply to increase as rapidly as output. The effect on prices of the slow growth in the money supply was enhanced by the secular decline in velocity which occurred at the same time. Undoubtedly the marked discontent and uncertainty concerning monetary institutions contributed greatly to the decline in velocity. With the increase in world production of gold and consequent increase in the money supply after 1896, the decline in prices was reversed, marking the end of the deflationary period.

Chapter 5

Trends in Growth

The rapid growth during the years 1873-1896 did not proceed at the same rate in all sectors of the economy. It was mainly in these years that the American economy underwent the great structural changes which transformed it from a predominantly agrarian economy into a first-class industrial giant. At the same time that these changes were occurring, the dynamic American population was also being subjected to great shifts caused by the westward migration of people that extended all the way to the shores of the Pacific, motivated by new opportunities presented by the availability of transportation in new areas as railroads extended their tracks into lands which had heretofore been of limited use to farmers because of the difficulties involved in getting crops to markets.

The movement toward increased industrialization and the shifts in population reinforced each other. The development of mining in the West, for example, created a demand for labor, which in turn provided a ready market for farm products and manufactured goods. The stimulus this provided for the development of agriculture and other industries attracted more people to this area, creating even larger markets, and so on.*-

5.1 Population

As was mentioned earlier, population increased during the years 173-196 at a rapid average annual rate of 2.[1] percent, for a net increase of 69 percent. This growth was spread fairly evenly throughout the entire period, although the growth of population slowed somewhat toward the end of the period. Population increased 26 percent in the decade 170-179, 25 percent in the decade 10-19, and 21 percent in the years 190-199.

The pattern of population growth in the last thirty years of the nineteenth century reveals much about the changing economic opportunities and spatial changes in the structure of American industry and agriculture. Table V-l indicates the extensive population shifts which occurred during the long period of deflation.

[1]Prospector, Cowhand, and Sodbuster, Vol. XI, The National Survey of Historic Sites and Buildings (Washington: United States Department of the Interior, National Park Service, 1967), p. 65. Source: Solomon Fabricant, "The Changing Industrial Composition of Gainful Workers: Some Comments on the American Decennial Statistics for 1820-1940," Studies in Income and Wealth, Volume 11 (New York: National Bureau of Economic Research, 1949), p. 42.

TABLE V-1

POPULATION BY REGION, 1870-1900

	1870	1830	1890	1900
New England	3,487,924	4,010,529	4,700,749	5,592,017
Middle Atlantic	8,810,806	10,496,878	12,706,220	15,454,678
East North Central	9,124,517	11,206,668	13,478,305	15,985,581
West North Central	3,856,594	6,157,443	8,932,112	10,347,423
South Atlantic	5,853,610	7,597,197	8,857,922	10,443,480
East South Central	4,404,445	5,585,151	6,429,154	7,547,757
West South Central	2,029,965	3,334,220	4,740,983	6,532,290
Mountain	315,385	653,119	1,213,935	1,674,657
Pacific	675,125	1,114,578	1,888,334	2,416,692

Source: Historical Statistics, Series A 123-180, pp. 12-13.

New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut

Middle Atlantic: New York, New Jersey, Pennsylvania

East North Central: Ohio, Indiana, Illinois, Michigan, Wisconsin

West North Central: Minnesota, Iowa, Missouri, Kansas, N. Dakota, S. Dakota, Nebraska

South Atlantic: Delaware, Maryland, District of Col., Virginia, W. Virginia, N. Carolina, S. Carolina, Georgia, Florida

East South Central: Kentucky, Alabama, Tennessee, Mississip

West South Central: Arkansas, Texas, Louisiana, Oklahoma

Mountain: Montana, Idaho, Utah, Wyoming, Colorado, New Mexico, Arizona

The Middle Atlantic and East North Central states could not match the relative growth in the last thirty years of the nineteenth century of the lands to the west which were almost untouched in 1870. The transformation from an agrarian to an industrial economy was perhaps more apparent in these two areas than anywhere else. Agriculture, which prior to 1870 had been important throughout these areas, for the most part, shifted to the west in this period. With the notable exception of Illinois, the agriculture that remained was largely of the truck garden and dairy farm variety.

The New England states, which had been relatively highly industrialized in 1870, had the smallest relative increase in population from 1870 to 1900; an increase of 60 percent, reflecting tl^e slow growth of the specialized industries of that area. The East South Central states and the South Atlantic states had increases in population of 71 percent and 78 percent respectively.

The westward movement of population in these years is also apparent in the increase in population in the Mountain states, where the mineral discoveries helped cause an increase in population of 431 percent, and in the increase of 258 percent in the population of the Pacific states. Although the population increase of 168 percent in the West North Central states was lower than in other parts of the West, it was still nuch higher than the over-all average, and reflects the opportunities afforded by agriculture in this area of fertile land.

5.2 Growth and Relative Sector Shares

Gross output in agriculture at constant prices increased by about 138 percent from 1870 to 1900. The average annual rate of gross farm output in these years was 2.[2] percent. Since GNP increased by more than 300 percent in the same period, agriculture grew at only a little more than half the rate of the entire economy, and even more slowly in relation to the nonagricultural sector.

The result of the failure of agriculture to keep up with the rest of the economy was the loss of its position of dominance. In 1870 agriculture had been by far the largest single sector in the economy. Rv 1900 this was no longer true, although agriculture still retained a position in the economy of importance greater than its relative size at that time would indicate because of its central position in foreign trade.

Table V-2 shows the changes in the sectoral distribution of the gainfully employed in the years 1870-1900. The gainful worker concept does not correspond precisely to that of the labor force. The gainful worker figures, the only type of estimate of occupational breakdown of workers available for these years, was undertaken during census counts as a count[3] of occupations. The gainful worker figures therefore include retired persons no longer actively engaged at their trade, and omit such persons as students and housewives who may have been part of the labor force at the time of the census, but who considered their jobs as temporary. Nevertheless, the gainful worker figures probably give a fairly accurate picture of changes in the relative importance of the different sectors in the use of labor.

182

TABLE V-2

INDUSTRIAL DISTRIBUTION OF GAINFUL WORKERS, 1870-1900
(In Thousands)

Year	Total	Agriculture	Forestry and Fisheries	Mining	Manufacturing and Hand Trades	Construction
.900	29,070	10,710	210	760	6,340	1,660
.890	23,740	9,990	180	480	4,750	1,440
.880	17,390	8,610	95	310	3,170	830
.870	12,920	6,430	60	200	2,250	

[2]For an explanation of the gainful worker concept, see Solomon Fabricant, "The Changing Industrial Distribution of Gainful Workers: Some Comments on the Decennial Statistics, 1820-1840," in Studies in Income and Wealth, Volume 4 (New York: National Bureau of Economic Research, 1949), 3-45.

[3]Historical Statistics of the United States: Colonial Times to 1957 (TjT S. Department of Commerce, Bureau of the Census, 1961), p. 68.

5.3 Agriculture

The relative decline of agriculture is reflected in Table V-2. In 1870, almost half of all gainful workers were engaged in agriculture. In 1900, only about one-third of all gainful workers were in agriculture. Even so, more gainful workers were listed in agriculture in 1900 than in any other sector. The failure of employment opportunities in agriculture to expand as rapidly as opportunities for employment in other sectors meant that there was only a relative, and not an absolute, shift of population from the farm to the city.

The relative shift away from agriculture in terms of output originating on the farm was greater than the shift indicated by the change in gainful workers. In 1870, about 42 percent of GN;P originated in agriculture, while in 1900, only about 24 percent of GNP was accounted for in this sector. Table V-3 shows the total value added in constant dollars by four selected sectors. Value added in agriculture, mining, manufacturing, and construction increased at an average annual rate of 4.[4] percent from 1874 to 1899. In contrast, value added in agriculture alone increased at an average annual rate of 2.8, percent. This rate of increase was only slightly more than half of that for manufacturing and substantially less than half that for mining.

Table V-4 indicates that the share of agriculture in commodity output increased slightly from 1874 to 1879, but then declined steadily through 1894. The relative decline was apparently halted after 1894, but agriculture's share in 1899 was only 1 percent greater than in 1894. Agriculture accounted for more than 50 percent of commodity output in 1870, so that the decline in agriculture's relative share began before the secular decline in prices started in 1873- The interruption of the decline in agriculture's relative share in commodity output between 1874 and 1879 must have been at least partly due to the stimulation of production in agriculture by the great demand from abroad in

[4]Ibid., Series P13, p. 409- ' 'As an example of the conflicting data concerning construction, see Historical Statistics, op. cit., Series N61-67, p. 383. Source: Col. (1) John Kendrick, Productivity Trends in the United States (Princeton: Princeton University Press, 1961), Table E-I, p. 493. Col. (2) kuznets, *Capital in the American Economy*, Table R-30, pp. 575-77. Source: Col. (1) Kendrick, Productivity Trends in the United States. Table G-II, p. 541. Cols, (2) and (3) Long Term Economic Growth. Series C 210, p. 235.

186

TABLE V-3

VALUE ADDED BY FOUR SELECTED INDUSTRIES,
1874-1899, IN 1879 PRICES
(Billions of Dollars)

Year	Total	Agriculture	Mining	Manufac-turing	Con-struc-tion
1899	11.75	3.92	.55	6.26	1.02
1894	10.26	3.27	.39	5.48	1.12
1889	8.66	3.24	.35	4.16	.92
1884	7.30	3.00	.23	3.22	.86
1879	5.30	2.60	.15	1.96	.59
1874	4.30	1.98	.11	1.69	.40

Source: Gallman, "Commodity Output, 1839-1899," Table A-1, p. 43.

TABLE V-4

SECTOR SHARES IN COMMODITY OUTPUT, 1874-1899
(Percent)

Year	Agri-culture	Mining	Manfac-turing	Con-struc-tion	Total
1899	33	5	53	9	100
1894	32	4	53	11	100
1889	37	4	48	11	100
1884	41	3	44	12	100
1879	49	3	37	11	100
1874	46	2	39	12	100

Source: Gallman, "Commodity Output, 1839-1899," Table 4, p. 26.

5.4 Manufacturing

Taking atriculture's place and emerging during the years 1870-1900 as the dominant sector in the economy was manufacturing. In 1830, about 16 percent of all gainful workers listed their occupation as belonging in the manufacturing sector. In 1900, this figure had increased to 22 percent.

As with agriculture, the extent of the relative shift in gainful workers does not fully indicate the increasing importance of manufacturing in these years. Value added in manufacturing increased at an average annual rate of 5. percent from 1874 to 1899- Frickey's index of manufacturing production shows an average rate of increase of 5*1 percent in these years. Thus Table V-3 shows an increase in value added bymanufacturing of 270 percent from 1874 to 1879, while Frickey shows an increase in manufacturing production of 245 percent. V.'hile it is slightly lower, Frickev's index confirms the fact that manufacturing grew very rapidly during the period of falling prices.

Growing at a rate far in excess of agriculture, manufacturing, which began the period of deflation behind agriculture in value of production, ended the period as by far the most dominant sector in the economy. Table V-4 shows the increasing relative importance of manufacturing. In 1874, manufacturing accounted for less than 40 percent of total commodity output. By 1899, more than half of all commodity output originated in manufacturing. Manufacturing's share in commodity output declined slightly from 1874 to 1879, but this was due as much to the extraordinary increase in output in agriculture, which has already been mentioned, as to the slight retardation in the growth of manufacturing in these years.

Talning Combining with the rapid growth in manufacturing to make the U. S. predominantly an industrialized nation by 1900 was the extraordinarily rapid growth in mining. In 1870, only about 1. percent of all gainful workers were listed under mining. By 1900, 2. percent of all gainful workers listed their occupations as connected with mining. Although mining increased its relative share of gainful workers by more than 70 percent in this thirty year period, it was still very small in relation to other sectors in 1900.

Table V-3 indicates that value added grew at a more rapid rate from 1874 to 1899 in mining than in manufacturing, in spite of the very rapid growth in the latter sector. Growing at an average annual rate of 6. percent, value added in mining increased by 400 percent in these twenty-five years, while as noted above, value added in manufacturing increased 270 percent.

Growing at this rapid rate, mining increased its share of commodity output by 250 percent from 1874 to 1879. But because it accounted for only 2 percent of commodity output in 1874, it still only accounted for a small share,

It would be wrong to measure the importance of mining during the period of deflation by its relative share in gainful workers or output. Much more than agriculture or manufacturing, mining was a highly geographically centralized economic sector. Its importance to large areas in the 'Vest, where much of the growth in mining occurred, and where there was little else except mining, was therefore much greater than the relative share of mining in total output would indicate.

Gallman's figures on value added in construction (see Table V—3) indicate that construction did not grow as rapidly as other major sectors. The various statistics on construction during the years 1870-1900 are not consistent. Different sources give widely differing views on construction in this period.' ' Table V-5 presents two series on construction which indicate more vigorous growth in this sector than that shown by the value added series in Table V-3.

Kendrick's series shows total output in contract construction increasing 269 percent, or at an annual average rate of 4. percent from 1869 to 1899* Kuznets' five year moving average of gross total construction increases 264 percent from 1871 to 1899 at an average annual rate of 4. percent. These estimates of activity in construction contrast greatly with the value added series for construction in Table V-3 which shows an increase of 155 percent at an average annual rate of 2. percent from 1874 to 1899. The series on construction in Table V-3 is not strictly comparable with those of Table V-5 because The role the railroads played in the financial crises during the years 1873-1896 has already

been mentioned. Railroads dominated the transportation industry in these years, and the growth of transportation was in reality largely the growth of the railroads. It was the rapid growth of the railroads during the era of declining prices which attracted the large amounts of foreign capital whose periodic repatriation during the recurring crises of railroad failures helped precipitate the financial panics.

TABLE V-5

TWO ESTIMATES OF CONSTRUCTION, 1869-1899

Year	Kendrick Total Output (1929 = 100) (1)	Kuznets Gross Total Construction Five Year Money Average (Billions of 1929 Dollars) (2)
1899	43.5	5.46
1889	33.4	4.37
1879	18.4	2.12
1871		1.50
1869	11.8	

Source: Col. (1) John Kendrick, Productivity Trends in the United States (Princeton: Princeton University Press, 1961), Table E-I, p. 498. Col. (2) Kuznets, Capital in the American Economy, Table R-30, pp. 576-77.

The magnitude of the growth in transportation during the period of deflation is indicated in Table V-6. If the decade average of output for 1869-1873 is centered on 1874, the increase in transportation output from 1874 to 1899 was at an average annual rate of 7. percent. In an era of extremely rapid over-all economic growth, transportation was increasing at an extremely rapid rate which made it stand out among other sectors.

The columns showing total production workers and workers in transportation were derived by Kendrick

194

TABLE V-6

OUTPUT AND WORKERS IN TRANSPORTATION, 1869-1899

Year	Output of Covered Industries (1929=100) (1)	Persons Engaged in Transportation (2)	Total Persons Engaged in Production (3)
1899	27.5	1,908	26,861
1889	15.6	1,435	21,620
1879-1888[a]	10.3	766	15,639
1869-1878[b]	4.7	569	11,910

[a]Annual average for decade for Col. (1), for Cols, (2) and (3) figures are for 1879.

[b]Annual average for decade for Col. (1), for Cols, (2) and (3) figures are for 1869.

Source: Col. (1) Kendrick, Productivity Trends in the United States, Table G-II, p. 541.
Cols, (2) and (3) Long Term Economic Growth, Series C 210, p. 235.

Annual average for decade for Col. (1), for Cols, (2) and (3) figures are for 1869.

from the data underlying the gainful worker statistics presented in Table V-2, but have been adjusted to conform more closely with traditional labor force concepts. While total persons engaged in production increased 126 percent from 1869 to 1899, workers engaged in transportation increased 235 percent, or almost twice as much as all workers.

Capital Formation

Cutting across sector lines, but still a very prominent feature of economic growth during the period of falling prices, was the very high rate of capital formation. Table V-7 shows that gross capital formation as represented by five-year moving averages increased at an average annual rate of 5. percent from 1873 to 1900. Gross capital formation thus increased at a more rapid rate in these years than did GNP.

Table V-8 shows the relative shares of capital formation in national income. Almost one-fourth of GNP was devoted to gross capital formation in the period from 1869 to 1898. Gross capital formation as a percent of GNP at constant prices was higher in the decade 1889-1898 than in any other comparable period on record.

TABLE V-7

FIVE YEAR MOVING AVERAGES OF CAPITAL CONSUMPTION AND FORMATION, 1873-1900, 1929 PRICES (Billions of Dollars)

Year	Gross Capital Formation	Capital Consumption	Net Capital Formation
1873	2.40	.95	1.45
1875	2.70	1.10	1.60
1880	3.94	1.53	2.42
1885	4.71	2.09	2.62
1890	6.53	2.82	3.71
1895	7.23	3.49	3.74
1900	9.20	4.15	5.06

Source: Kuznets, Capital in the American Economy, Table R-29, p. 272.

TABLE V-8

SHARES OF CAPITAL FORMATION IN THE NATIONAL PRODUCT, 1869-1898
(Percent)

Year	Percent of Gross National Product: Capital Consumption	Percent of Gross National Product: Net Capital Formation	Percent of Net National Product: Gross Capital Formation	Percent of Net National Product: Net Capital Formation
		1929 PRICES		
1869-1878	9.5	13.9	23.4	15.4
1879-1888	9.8	13.1	22.9	14.5
1889-1898	12.1	14.0	26.0	15.9
		CURRENT PRICES		
1869-1878	8.0	12.3	20.3	13.4
1879-1888	8.7	11.8	20.6	13.0
1889-1898	10.7	12.5	23.1	13.9

Note: The percent shares in constant and current dollars vary because of the differential trends of the prices of capital and total product.

Source: Kuznets, Capital in the American Economy, Table 8, p. 92.

The distribution of capital stock among the various sectors of the economy is shown in Table V-9. The changes in the distribution of the capital stock between 1830 and 1900 reveals the broad trends in growth which have been discussed in this chapter. Agriculture's share declined during this interval while the relative shares of mining and manufacturing increased. The share of the regulated industries, including the railroads, declined slightly from 1830 to 1900, but the regulated industries still had over half of the total capital stock in 1900, and these industries also accounted for more than half of the net capital formation occurring in these years. The importance of the railroads during the years 1873-1876 is even more enhanced by their major role in capital formation, since, especially in the early part of the period 1870-1900, railroads dominated the regulated industries.

Foreign Trade

The foreign trade of the U. S. during the period 1873-1896 was discussed in an earlier chapter. The U. S. increased its exports relative to its imports in these years. Table V-10 shows this relative shift. It also indicates that the relative importance of exports and imports to domestic output did not change greatly in these years.

199

TABLE V-9

SECTOR SHARES IN CAPITAL FORMATION,
1880 and 1890

Year	Agriculture	Mining	Manufacturing	Regulated Industries	Total
	Percent of Total Capital Stock				
1880	31.9	1.8	9.1	57.2	100
1900	22.5	4.0	19.6	53.9	100
	Percent of Net Capital Formation, June 1, 1880, to June 1, 1900				
	12.0	6.5	31.4	50.1	100

Source: Kuznets, Capital in the American Economy, Table 27, p. 198.

200

TABLE V-10

U. S. EXPORTS AND IMPORTS AS A PERCENTAGE
OF GNP, 1869-1899,
CURRENT DOLLARS

Year	Exports	Imports
1869	5.2	7.1
1874	7.5	7.6
1879	9.0	6.1
1884	6.6	5.7
1889	6.8	6.5
1894	6.8	5.7
1899	7.6	4.9

Source: Lipsey, Price and Quantity Trends, Table G-13, p. 434.

Chapter 6

Agriculture and Falling Prices

Much of the discontent with social and economic conditions during the years of deflation was centered in the farm sector. Whether imagined or real, the complaints of the farmers received much attention because of the relatively large size of the farm sector. More than the complaints of any other group, those of the farmer have caused these years of deflation to be characterized as years of general economic stagnation.[1] It would be wrong to view all of the discontent expressed by farmers during these years as originating in this period. The Grange was established by farmers in 1863. Farmers had complained before this time that railroad monopolies discriminated against them in the setting of freight rates. Another source of railroad-farmer discord was the debtor-creditor relation between these croups which arose from the role of the railroad as a supplier of land in the West.

Another major complaint of the farmer in this period concerned the difficulty experienced by the farmer in obtaining credit to buy the land, machinery,[2] and other items necessary for his farm. The Grange was supposed to deal with this problem, too.

These problems existed before the decline in prices began in 1$73> and can not be traced to deflation. Railroad freight charges declined during the years of deflation just as other prices, although the extent of the decline in relation to the decline in prices in general can not be ascertained.[3] Railroads received large land grants from the government, which they sold in turn to farmers. These railroad grants contained good farm land with access to the markets through the railroads. These lands were thus desirable to farmers moving West to escape the effects of soil depletion in the East.

The credit problem of the farmer, where it really existed, was usually a question of adequate banking facilities in the new areas settled in the West. Frequently, the only sources of credit were some distance away, and often enjoyed monopoly power.

These problems were not caused by falling prices. Indeed, these continued to be problems long after prices began to rise in 1#97.

But some complaints of the farmer were related to falling prices. It was pointed out in Chapter II that a decling price level raised the level of the real rate of interest, resulting in an increased real burden of previously contracted debt. According to Bemis, one of the most important complaints of the farmer concerned the fall in prices which "has made his mortgage loan, contracted when prices

[1]The story of agriculture and its expansion in the West during the last third of the nineteenth century is well documented in Ray Allen Pillington, Westward Expansion (New York: Macmillan Co., 1950), and Fred A. Shannon; The Farmer 's Last Frontier (New York: Rinehart and Co. , Inc., 1945)

[2]Edward W. Fernis, r'The Discontent of the Farmer," *Journal of Political Economy*, I (March, 1893), 200.

[3]Bemis, op., cit. , p. 200.

were high, more and more burdensome."[4] Taussig also pointed to the increased real burden of debt caused by deflation as the chief complaint of the farmer, and the complaint which for that reason received the most attention, and "in some ways Z. doubtless has deserved it most." It-should be noted that the farmers were not the only ones who condemned the declining prices on this point: the old nemesis of the farmers, the railroads, also complained of the 7 increased real burden of their debt.

Another complaint heard often from the farmers concerned the declining prices which he received for his produce. The farmers argued that while the prices of agricultural goods were declining, he had to pay g high prices for his supplies and farm implements.

6.1 Growth in Agriculture

The complaints listed above were repeated over and over by agricultural interests in the years 1873-1896. Taken by themselves they indicate depressed conditions for the farmer. And this has been the interpretation of this period by many historians. Host of these same historians, however, fail to support their conclusions by more than the quotes of the farmers themselves. As Henry P. Steer said, "most historians seem to have been so deafened by the noisa of agrarian politics that they have never taken a hard and disinterested look at economic realities in a swiftly changing enterprise.

Does the performance of agriculture in the period 1873-1896 confirm or refute the view of these years as ones of depression for farmers? Table VI-1 shows that gross output in agriculture increased 123 percent from 1869 to 1896, or at an annual average rate of 3 percent. This growth did not take place at a steady rate throughout the period. Like GNP, gross output in agriculture increased most rapidly in the early part of the period. From 1869 to 1879, gross farm output increased at an annual rate of 4-6 percent. The increase from 1879 to 1889 was only about 26 percent. The increase of gross farm output from 1889 to 1899 was about the same as that for the decade 1879-1889. In both of these decades, the average annual rate of increase was only a little more than half the annual rate for the decade 1869-1879.

As Table VI-2 indicates, the increase in the number of farms and the increase in farm land follows for the most part a similar pattern of growth, and this tends to confirm the fact that agricultural growth increased more rapidly in the 1870's than in any other decade in the years 1870-1880.

Chart VI-1 shows the movement in wholesale farm prices according to Warren and Pearson. Using initial and terminal years of 1873 and 1896 respectively, wholesale prices of farm products declined at an average annual rate of 2.[5] percent in this period.

[4] H. T. Newcomb, op. cit.

[5] Eemis, op., cit., 207-

FARM PRODUCT, 1869-1899

(1929 = 100)

Year	Gross Product (1)	Net Product (2)
1899	73.3	79.8
1898	72.5	79.8
1897	69.3	76.4
1896	64.4	71.1
1895	60.0	66.3
1894	56.4	62.3
1893	54.4	60.2
1892	55.8	61.8
1891	58.7	65.1
1890	56.3	62.6
1889	57.2	63.6
1879	45.2	50.8
1869	28.3	32.7

Source: Kendrick, Productivity Trends in the United States, Col. (1), Table R-II, p. 365; Col. (2), Table B-I, p. 362.

208

TABLE VI-2

NUMBER OF FARMS AND FARM ACREAGE, 1870-1900

Year	Number of Farms (1,000 farms)	Land in Farms (1,000 acres)
1900	5,737	838,503
1890	4,565	623,207
1880	4,009	536,604
1870	2,660	407,723

Source: Historical Statistics, Series K 1-2, p. 278.

Farm prices fell in the seven years of the period 1873-1879 at an annual average rate of 5.7 percent. The decline in prices was then sharply reversed, and farm prices rose by about 38 percent from 1879 to 1882. As a result of this sharp increase, farm prices in 1882 were back at the level they had attained in 1875.

This rapid increase in prices was in turn reversed by a sharp decline from 1882 through 1886. Prices fell in this four year period at an annual rate of 8.9 percent. From 1886 through 1893, farm wholesale prices fluctuated widely with little noticeable

in the seven years of the period 1873-1879 at an annual average rate of 5*7 percent. The decline in prices was then sharply reversed,[6] and farm prices rose by about 3# percent from 1879 to 1832. As a result of this sharp increase, farm prices in 1832 were back at the level they had attained in 1875 • This rapid increase in prices was in turn reversed by a sharp decline from 1832 through 1836. Prices fell in this four year period at an annual rate of 3.[7] percent. From 1836 through 1893> farm wholesale prices fluctuated widely with little noticeable trend. From 1893, prices declined until they reached their low point for the entire twenty-four year period in 1896. The timing of farm price changes was similar to that of all prices, indicating that the same factors generally accounted for the price decline in both sectors.

The decline in farm prices seems to have had no clear influence on the rate of growth of output in agriculture. The most rapid growth occurred when prices were falling steadily in the 1870's. Without annual estimates of farm output for the 1830's, the effect on growth of the various changes in prices can not be separated. We do know, however, that growth in the 1830*s was considerably slower than it was in the preceding decade. Price movements in the 1890's were not at all similar to those of the l330's, yet growth of output in these two decades was about the same.

One of the most important determinants of the rate of growth of output in agriculture is the rate of growth of the population. This results from circumstances described in Engel's Law, which

[6]Taussig, op. cit., p. 101.

[7]Ibid. °Prospector, Cowhand, and Sodbuster, op. cit., p. go.

states that as per capita income increases, a smaller proportion of income will be spent on food. As his income increases, the increase in an individual's consumption of food is narrowly limited by the capacity of his stomach. It is therefore not surprising that output in agriculture failed to expand as rapidly as output in other sectors of the economy.

Population increased at a steady rate of 2.[8] percent in the years 1870-1900. The annual rate of growth of gross farm output of 2.[9] percent from 1830 to 1900 was thus slightly larger than the rate of population growth in these years. Growth in agriculture after 1830 thus seems to be about what one would expect, and in accordance with Engel's Law. Population growth must have limited the growth of farm output in these years.

Engel's Law does not offer an explanation of the extremely rapid growth in agriculture during the 1870's. The annual rate of growth in agriculture was more than twice the annual rate of population growth. One obvious way for agriculture to escape the limitations placed on it by the growth of domestic population is through production for the world market.

This process seems to be at least a partial explanation for the rapid growth in agriculture that occurred in the 1870's. Table VI-3 shows that the share of agricultural exports in total farm gross product more than doubled from 1869 to 1879, reaching a high point in the latter year. After 1879, the ratio of agricultural exports to farm gross product declined through 1834. This ratio showed an upward trend from 1834 to 1892, and from 1895 to 1893, with a decline in the interval between. The ratio of.277 in 1893 was the second highest of the period 1869-1899, but still was considerably under the figure for 1879.[10] It will be recalled that 1879 was a year of bountiful harvests in the U. S. and extremely poor harvests in Europe. It will also be recalled that U. S. agricultural exports were also high in 1877, 1873, 1830 and 1831. Indeed, well over 25 percent of U. 3. agricultural output was exported in these years.

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[8]Henry P. Steer, Lumber Production in the United States, 1799-1946 (Washington: IJ. S. Department of Agriculture, 'iiscellaneous Publication No. 699, 1948), p. 51. Source: Kendrick, Productivity Trends in the United States, Col. TlT, Table R-II, p. J5J: Col. (2), Table P-I, p. 362. These figures were taken from Robert E. Lipsey, Price and Quantity Trends in the Forei_gn__Trade of the United States (Princeton: Princeton University Press, 1963), Table 6-14, p. 436, and are based upon his estimates of agricultural exports, and estimates of gross farm output extrapolated by Lipsev from Frederick Strauss and Louis H. Bean, Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869-1937, U. S. Department of Agriculture, Technical Bulletin No. 703, p. 24, Table S. These annual estimates by Lipsev were not used in this

[9]Ibid., p. 331. 13 "Tor an excellent discussion of government land policy in the years of deflation, see Fred A. Shannon, The Farmer's Last Frontier, op. cit.

[10]Paul W. Gates, Fifty Million Acres: Conflicts Over Kansas Land Policy, l854-l890 (Ithaca: Cornell University Press, 1954).

211

TABLE VI-3

SHARE OF AGRICULTURAL EXPORTS AND IMPORTS IN FARM GROSS PRODUCT, 1869-1899

Year	Ratio of Agricultural Exports to Farm Gross Product	Ratio of Agricultural Imports to Farm Gross Product
1899	.245	.128
1894	.231	.146
1889	.220	.134
1884	.185	.098
1879	.289	.116
1874	.164	----
1869	.125	----

Although no figures on agricultural imports are available before 1879, it is safe to assume that the conditions which gave rise to the large volume of agricultural exports in the 1370fs did not also give rise to a matching increase in agricultural imports. The heavy farm exports in the latter part of the 1370Ts thus gave U. S. agriculture a chance to increase its output in these years at a rate considerably in excess of the rate of growth of population. In constant dollars, U. S. agricultural exports increased from 1869 to 1879 at an average annual rate of 7.[11] percent, in contrast to the annual rate of increase for total gross farm output in this period of 4*6 work because they do not agree with other estimates of gross farm product for this period. These estimates show a greater increase in output than most other estimates. While the ratio of agricultural exports to gross farm output would be higher if Lipsey's series on exports were compared with other estimates of gross farm output, it is the magnitude and direction of changes in the ratio that are most important, and not the absolute value of the ratios. The understatement of the share of agricultural exports in gross farm products thus does not alter the conclusion that exports increased relatively more rapidly than total farm product in the 1870's.

percent. On the other hand, agricultural exports increased by only 4 percent from 1879 to 1839, and 61 percent from 1839 to 1899, as Table VI-4 shows.

Agricultural imports increased by 57 percent from 1879 to 1839, an increase far in excess of the increase in agricultural exports. From 1839 to 1899, farm imports increased 43 percent. In the decade 1879-1839, then, U. S. farmers were not able to escape the limits on growth of output imposed by population growth through export markets. And even though farm imports increased more rapidly than farm exports, they composed only about 13 percent of gross farm output in 1839. From 1839 to 1899, even though agricultural exports increased more rapidly than agricultural imports, a slight decline in population growth apparently prevented output in agriculture from expanding more rapidly than in the previous decade.

Growth within the agricultural sector did not proceed at a uniform rate for all farm commodities during the period of deflation. Changes in the composition of output had an uneven impact among

[11] Bemis, o£. cit.

farmers. Those farmers not able to shift easily out of products experiencing declining demand to those experiencing increasing demand were hit hardest. Table VI-5 shows these shifts in the composition of farm output.

214

TABLE VI-4

VALUE OF U.S. EXPORTS AND IMPORTS OF AGRICULTURAL PRODUCTS, 1869-1899
(Millions of 1913 Dollars)

Year	Exports	Imports
1899	1,298	---
1894	926	---
1889	807	251
1884	649	292
1879	777	368
1874	405	367
1869	248	412

Source: Lipsey, Price and Quantity Trends, Table A-7, p. 155.

At the same time that the composition of output was changing, the centers of farm production were moving westward. While this general movement took place, production of some crops still were centered in the East in 1899. New York, for example, was still a leading state in the production of potatoes and dairy cows. And Ohio was still a leading sheep producing state.[11] But those farmers in the East who experienced

[11]

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[12]Kuznets, *Capital in the American Economy*. o p. cit. , Table 27, p. 198.....

Total 3,403 100 3,292 100 3,334 100 4,023 100 541 15.[13] 477 14.[14] 493 14.[15] 619 15.[16] 147 4.[17] 135 5.[18] 117 3.[19] 242 6.

TABLE VI-5

GROSS INCOME IN AGRICULTURE FROM SELECTED PRODUCTS, 1869-1899
(In Millions of Dollars)

	1869		1874		1879	
	Income	% of Total	Income	% of Total	Income	% of Total
l Gross come	1,724	100	1,989	100	2,628	100
t	266	15.4	326	16.4	434	16.5
	53	3.1	80	4.0	148	5.6
	28	1.6	27	1.4	41	1.6
on	124	7.2	173	8.7	269	10.2
	37	2.1	42	2.1	54	20.5
	144	8.4	167	8.4	210	7.8
	416	24.1	412	20.7	482	18.3
y Products	143	8.3	190	9.6	255	9.7
st Products	74	4.3	85	4.3	96	3.7
h Potatoes	52	3.0	47	2.4	60	2.2
	44	2.6	44	2.2	56	2.1

in the American Economy, Table A-2, pp. 46-48.

a declining demand for their crops or who suffered from the effects of soil depletion and were unable to compete with western farms experienced real decline in income. Unquestionably one of the primary reasons for the westward expansion of agriculture in this period was the government policy with regard to the disposal of public lands. A number of laws were passed in an effort to pass the western public lands into the hands of private owners at low prices. Hut even at low prices, some of the lands offered for soil were not worth the price. And even if they were, farmers still had difficulty in obtaining the necessary cash.

As was mentioned earlier, the railroads became active in financing the sale of their lands to farmers. T!any railroads found their activities as suppliers of land to be more lucrative than their freight and passenger traffic. Some railroads even established model demonstration farms to lure

[13]Bemis, op. cit. lgIbid., 203-209-

[14]Ibid., 207. ^°Taussig, op. cit., p. 101.

[15]For a very interesting account of the advances in the application of machinery to agriculture, see Leo Rogin, The Introduction of Farm Machinery in its Relation to the Productivity of Labor in the Agriculture of the United States During the Nineteenth Century (Berkeley: University of California Press, 1931U

[16]Thorstein Veblen, "The Price of Wheat Since 1867," Journal of Political Fconomv, I (December, 1892), 85.

[17]Thorstein Veblen, "The Price of Wheat Since 1867," *Journal of Political Economy*, I (December, 1892) , W. ..... .

[18]See Page 224.

[19][chart data, omitted]

farmers into areas where they were selling land. 1? "lany farmers found it more advantageous to purchase fertile land from the farmers than to obtain barren land free under the Homestead Act.

The economic impact of the disposal of public lands during the years of deflation is difficult to Prospector, Cowhand, and Sodbuster.

assess. Frederick Jackson Turner's well known contention that the opening up of public lands in the West to private ownership served as a safety valve for the economy through 1890 by offerine nsw opportunities for those who would otherwise have been unemployed in the Sast has been challenged by Paul W. Gates. After considering Turner's arguments and analyzing other data, Gates concluded that the frontier was essentially closed by 1870. If Gates' persuasive argument is correct, the greatest initial impact of the programs to place public lands in the West in private hands was spent before the long secular decline in prices began in 1873* In any case, the land policy discussed above did succeed in transferring land from the public domain to private ownership. The newly opened fertile lands of the West, though perhaps settled somewhat earlier, provided the land and climate needed for the rapid increase in agricultural output during the years of deflation, spurred by the rapid population growth of those years.

Whatever the impact of land policy during the lengthy decline in prices, this policy had little direct connection with the secular decline in the price level. Land policy in>the years 1873-1896 was essentially a continuation of the same policies which had been put forth more than a decade earlier, and was motivated by the same considerations as the earlier land policy.

Paradoxically, the most important economic effect of land policy during theperiod 1873-1896 may not have been in agriculture at all. It has been argued that the prospect of free or low cost land served as a powerful magnet to attract immigrants to the United States. The heavy flow of immigrants in the years of deflation undoubtedly exerted an influence on the course of money wages as the labor supply was inflated by the immigrants who entered the labor force.

Some of the objects of the farmers' discontent have been pointed out. But it has also been pointed out that income in agriculture in real terms increased at a relatively rapid rate during these years of falling prices and farm unrest, although not as rapidly as economy-wide income. Did the economic lot of the farmer decline during the period of deflation in spite of the growth in aggregate farm income? It is to this question that we now turn.

> The one fact above all others complained of by farmer and wage earner alike is relative, not absolute, decline in the share of national income secured. The city grows faster than the country. The income of capitalist, or monopolist, or speculator, or man of large affairs grows faster than that of the farmer or wage-earner

Statements such as that above are not unique to the years of deflation. Such statements have persisted up to the present time. Periods of inflation have not succeeded in reversing the relative decline of the farm sector.

This relative shift in income and population away from agriculture and toward the rest of the economy talked about by Bemis has already been described and documented. V.'hat about Bemis' assertion that this shift in income was only a relative, and not an absolute, shift?

Table VI-2 shows that the number of farms increased by 116 percent from 1830 to 1B90. Table VI-5 indicates that real gross income in agriculture increased by 133 percent in the years 1#69-1#99. This implies that income per farm increased during the years of deflation.

While there was a decrease in the relative importance of agriculture in'the American economy in the years 1870-1900, there was still a large absolute increase in the size of the farming sector. The number of farms and the land in farms increased 116 percent and 166 percent respectively in these

years. Both of these figures increased more rapidly in this period than population, which did not quite double. Significantly, the increase in land in farms, while increasing the size of the average farm, did not result from a decline in the total number of farms.

Since there was actually a relative decline in the agricultural sector both in terms of work force employed and income originating in agriculture, the absolute increase in agriculture can not be viewed as resulting merely from depressed conditions in the nonfarm sector of the economy. Instead, it seems likely that although opportunities in agriculture were definitely limited, they were still sufficiently profitable to attract those in a favorable position to exploit them.

Strengthening this conclusion is the behavior of investment in agriculture. Table VI-6 shows that the total value of farm lands and buildings in current dollars increased steadily during the years 1870-1900. The average value per acre in current dollars increased in the years 1870-1890, but fell slightly from 1890 to 1900, although the figure for 1900 was higher than that for 1870. Since these values are stated in terms of current dollars, the figures greatly understate the increase in real terms. Depending upon the price index used to adjust these figures, the value of farm lands and buildings, and the value per acre in 1900 would be as much as twice as great in relation to 1870 values as those indicated in Table VI-6.

222

TABLE VI-6

VALUE OF FARM LANDS AND BUILDINGS, 1870-1900
(Millions of Current Dollars)

Year	Total Value (1)	Average Value Per Acre (2)
1900	16,603	19.81
1890	13,273	21.31
1880	10,193	19.02
1870	7,441	18.26

Source: Historical Statistics, Col. (1) Series K-4, p. 278, Col. (2), Series K-5, p. 278.

dollars increased steadily during the years 1870-1900. The average value per acre in current dollars increased in the years 1870-1890, but fell slightly from 1890 to 1900, although the figure for 1900 was higher than that for 1870. Since these values are stated in terms of current dollars, the figures greatly understate the increase in real terms. Depending upon the price index used to adjust these figures, the value of farm lands and buildings, and the value per acre in 1900 would be as much as twice as great in relation to 1870 values as those indicated in Table VI-6.

This indicates substantial investment in agriculture throughout the period of deflation. Kuznets' figures also indicate this. According to Kuznets, capital formation in agriculture accounted for 12 percent of net capital formation in the U. S. economy from June 1, 1830, to June 1, 1900. Capital formation in agriculture lagged behind economy-wide capital formation, and agriculture's share

in total capital formation fell markedly, again indicating the relative decline in agriculture. Nevertheless, more than 2 percent of GNP was devoted to capital formation in agriculture in these years. Table VI-6 also shows that total farm capital at constant prices more than doubled between 1870 and 1899.

Assuming that investment is undertaken in anticipation of future profits, so that it is an indicator of expected profitability, the behavior of farm investment presents a different picture of the economic status of the farmer than that obtained by viewing the period of deflation as the period of greatest farm agitation and unrest in American history. And the fact that the number and total value of farms increased steadily over the period of deflation indicates that at least part of the expected profits were realized.

6.2 Agriculture and Falling Prices

The primary object of the farmers' agitation was, of course, the declining prices they received for their output. Falling prices could diminish the real incomes of farmers in two ways: by declining more than other prices so that farm income fell not only in money terms, but also in terms of purchasing power, and throuch its effect on farm debt.

Let us consider the first case. If farm prices fell more than other prices, real farm incomes would fall unless farm physical output increased enough to offset the differential decline in prices. Among contemporary observers, Bemis considered this as a source of reduced farm income and rejected it. Bemis cited the Report of the Pennsvlvania Bureau of Industrial Statistics for 1890, and his own calculations to show that non-farm prices fell more than farm prices.

IS Bemis' contention is supported by Warren and Pearson. Chart VI-2 shows that farm prices fell less in the years 1873-1896 than did all commodity prices, according to price indexes constructed by Warren and Pearson. It was mentioned earlier that Warren and Pearson show a greater decline

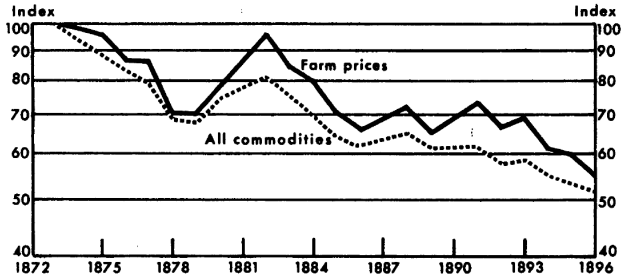

Chart VI-2. Comparison of All Commodity Prices and Farm Wholesale Prices, 1872-1896.

Source: Same as Chart VI-1.

Wholesale Prices, 1872-1896. Source: Same as Chart VI-1.

years than the three other price indexes presented. This does not alter our conclusion that prices received by farmers fell less during years of deflation than all prices, since we are interested here not in the absolute decline in prices, but in the relative decline in prices. The absolute price declines as shown by Warren and Pearson may be exaggerated, but there is no reason to suppose that the decline in all prices is overstated relative to one of its components, the decline in farm prices. It seems likely that the same error of overstatement would apply equally to all price indexes in this series by Warren and Pearson. If this is true, the price indexes shown in Chart VI-2 would be subject to the same error, leaving the relative differences in the two unchanged.

We can conclude that the direct effects of the price deflation favored the farmer by turning the terms of trade in his favor. In terms of purchasing power, the farmer received more goods in return for the same output in 1896 than in 1B73. The farmer had no real complaint concerning differential price movements caused by the deflation. Indeed, these movements were beneficial for the farmer.

On the other hand, farmers complained bitterly about the effect of falling prices on the debt carried by theiji, claiming the deflation increased the burden of their indebtedness. In listing the objects of farm discontent, Bemis said, "Last, but by no means least, the farmer complains of the general fall in agricultural prices in recent years, which has made his mortgage loan contracted when prices were high, more and more burdensome." Taussig confirmed this observation of Bemis' and said, "The burden on American debtors from falling prices has therefore been much more steadily complained of, chiefly in regard to the debts of farmers and other borrowers on a comparatively small scale." Taussig concludes that, "it is the farmer whose case has received most attention, and in some ways doubtless has deserved it most."

We concluded in Chapter II that there was no predisposition for believing that price deflation would depress new investment. But it was also pointed out that the burden of previously existing debt would be greater than before the deflation because the debtor would be surrendering greater purchasing power. We must carefully distinguish here between the effects of falling prices on the decision to invest and undertake new debt commitments, and on those who have already incurred debt.

Deflation could influence the growth and prosperit?/' of agriculture through either or both of these two ways. By curtailing new investment in agriculture, capacity for future growth will be limited. And if the burden of previously incurred debt becomes too heavy, farmers will fail.

As Chapter II showed, shifts in the investment and savings schedules might lower the nominal rate of interest enough or more than enough to compensate for the rate of price decline, and thus leave the rate of investment unchanged or even increased. Unfortunately, there is no reliable data on farm mortgage interest rates for the years of deflation: so that it is impossible to tell how these rates behaved. However, as will be explained in greater detail later, yields on railroad and municipal bonds declined throughout these years. It can be inferred from this that nominal interest rates in general declined during the years of deflation.

An additional factor helping to offset the effect on investmentof deflation was the increase in productivity in agriculture over this period. The period from 1870 to 1900 saw, in agriculture as elsewhere, great strides in the application of machin-pp ery to production.

> Agriculture is fast assuming the character of an "industry," in the modern sense, and the development of the next few decades may not improbably show us, in farming as in other occupations, a continued improvement in methods and a steady decline in cost of production, even in the face of a considerably increased demand.*4

In spite of the improvements in farming methods, productivity in the farm sectlor did not increase especially rapidly during the years of deflation. The average annual rate of increase in output per man hour in the years 1869-1899 was 1. percent.

> (1929 = 100) f>3. 64. 69. 79. Total Factor Productivity (1929 =100) 610. 70. 75. 73. Source: Kendrick, Productively Trends in the United

have seen, the growth of the farm sector from the standpoint of the increased number of producing units and the growth of output, while not as rapid as that of the non-farm sector, was still rapid in absolute terms during the period of declining prices. It seems likely that the growth of the farm sector was limited more by the expansion of the market than by any other factor. If changes

in the nominal rate of interest did not entirely compensate for the effect of the declining price level on the real rate of interest, a combination of lower nominal interest rates, productivity increases, and an improvement in farmers' terns of trade did, so that the declining prices did not result in a reluctance to commit new resources, both human and other, to agriculture.

On the other hand, a declining price level must always increase the burden of previously existing debt, if by the term "increased burden" is meant the surrender of greater purchasing power in discharging the principal of the loan than was received when the loan was contracted. But this concept of increased debt burden is not very useful as a measure of the economic hardships imposed by price deflation on the farmer in debt. We may all bemoan the fact that with different circumstances we could be better off than we are regardless of our actual condition.

The declining prices thus may not have worsened the standard of living of the farmer through its effect on farm debt. But this may have left the farmer in an inferior economic position onlj' in relation to what it might have been in the absence of deflation.

There is other evidence, however, which indicates that the consequences of deflation might have made it more difficult for the farmer to meet his mortgage payments. Reliable records of farm mortgages do not extend back beyond 1890, so little of a specific nature can be said about the volume and maturity of farm debt outstanding throughout the years of deflation, and hence about the relative burdens of mortgage payments made by farmers during this period. The ability of the farmer to meet his contractually fixed mortgage payments depended to a large extent on his money income. The number of farms increased by 116 percent in the years 1870-1900, while farm income in current dollars increased by only 55 percent. This implies that average income per farm in current dollars declined during the years of deflation. Accordingly, mortgage payments would have represented not only the surrender of more purchasing power, but would have also required a greater proportion of the farmers' income. If this is correct, then deflation increased the burden of the farmers' debt not only by requiring that the farmer give up more purchasing power than he received, but also by rpquiring the farmer to spend a greater portion of his income to discharge his debt.

But this also fails to say anything about how the farmer's standard of living was affected by deflation. Acting to offset the increased real cost of debt due to the decline in money income was the improvement in the farmer's terms of trade, which we have already noted. Because of the lack of data, little can be said in quantitative terms about which force predominated.

The debt burden of the farmer must be looked at fron still another angle. Crucial to the determination of the real burden of farm debt is not only the money income of the farmer, but also the value of assets standing behind the debt. This relationship is the best measure of the changing debt burden because it represents the ultimate ability of the farmer to liquidate his debt. If the dollar value of his assets is not as great as the dollar value of his debt because of falling prices, deflation has truly imposed a heavier burden on the farmer. If, on the other hand, the dollar value of the assets remains high enough to discharge the debt, then the burden of the debt can not be said to have increased in the sense of resulting in an actual worsening of the farmer's economic condition in this respect.

Referring back to Table VI-6, it can be seen that the average value per acre of farm land in current dollars increased from 1870 through 1890, but declined somewhat from 1890 through 1900. Chart VI-2 shows that the most rapid and steady declines in farm prices occurred in the years 1873-1879 and 1882-1836, while farm prices rose in the years 1896-1900. The average current dollar value per acre of land increased during the periods of nost rapid price declines, but fell in the decade whose

latter half was narked by an upswing in prices! Deflation did not impose an increased burden on debtors in the important sense of causing a depreciation in the dollar value of assets while the value of the debt remained fixed at its initial level.

What, then, was the cause of farm agitation? The discontent of the farmer, directed at the falling price level, was real and can not be left without an attempt at an explanation. It was stated earlier that deflation, even if not resulting in a lo'wer standard of living, still kept the debtor-farmer from enjoying benefits which would have accrued to him under a regime of stable prices. Coupled with this was the failure of agriculture to expand as rapidly as the rest of the economy. This lends credence to Bemis' contention that the farmer was disgruntled not because of an absolute decline in his real income, but because of a decline relative to income changes in other sectors.

Further evidence that this may have been a major source of irritation to farmers is the contemporary debate which took place over the question of whether the creditor deserved to be repaid the same amount of money as he loaned, or the same amount of purchasing power. John Cummings argued in 1894 that because of increased productivity, farmers could pay back the nominal value of their debts without any inconvenience. ° Jesse Orton answered Cummings in 1895 and declared that farmers should not surrender more purchasing power in repaying a loan than they received when the loan was contracted. L. S. rierriam argued in 1893 that increased productivity had lowered the marginal utility of a unit of output, and that the creditor deserved to receive in repayment the same utility, and not the sane purchasing power, as he loaned. Edward Ross replied to this by pointing out that since the creditor had nothing to do with increased productivity, he should receive the same purchasing power as he loaned, or in other words, with deflation, a lower dollar sum of money.

Throughout this debate the central issue seemed to be not whether the farmer had the ability to meet his payments without undue hardship, but whether the creditor, as a natter of fairness, should reap the gains wrought by deflation. The chief issue thus seemed to center on the moral aspects of the distribution of real income between farmer-debtor and creditor. The fact that this argument proceeded at this level suggests that farmers were really not harmed economically to any great extent through the effects of deflation on outstanding debt.

It would be easy to conclude from what has been said thus far that the main problem of agriculture in the years 1873-1896 was the failure of its rapid rate of growth to keep up with the extraordinary rate of growth in the rest of the economy. But that would be saying too much. Host of what has thus far been said about agriculture applies to aggregates. When particular groups of farmers are examined, problems which undoubtedly gave rise to some of the farm discontent of this period can be seen.

Productivity increases did not occur at a uniform rate for all areas and all products. This means, of course, that some farmers were able to offset the effects of deflation on their real indebtedness more easily than others. In addition, the rapid strides in technology which were made in this period rendered obsolete much equipment bought at great cost, causing heavier outlays for new equipment which created greater costs for those farms affected.

Those farmers who remained in areas where the soil had been depleted also failed to share equally in the gains made by agriculture. The opening up of new and fertile farm lands in the West gave rise to the westward shift of agriculture which we have already noted. Farmers in these new lands enjoyed the advantages of fertile soil, good climate, and favorable topography.

Finally, farmers during the period of deflation were subjected to the same uncertainties, such as weather conditions and insect plagues, which have traditionally posed problems for farmers of all

eras. In 1874, after an especially destructive grasshopper pi ague which devastated the area from the Dakotas to Texas, the by-word of many ruined farmers was, 'In God we trusted; in Kansas we busted."o In the face of difficulties inherent in farming, deflation was a highly visible phenomenon which prevented the farmer-debtor from realizing one source of gains which would otherwise have been his. On the other hand, the farmer realized gains from deflation through improvement in his terms of trade. The extent to which these opposing movements offset each other is uncertain. We do know that the farm sector grew rapidly during the period of deflation, and that other limitations on the growth of this sector during this period were at least as important as any limitation imposed by deflation.

Chapter 7

Growth in the Industrial Sector

The rapid growth in the non-agricultural segment of the economy was not concentrated in;'ust a few sectors, but occurred on a wide front. Similarly, the decline in prices was not confined to fust a few sectors, but was a pervasive decline spread throughout the economy. This much is indicated by the great extent of the growth accompanied by the rapid and deep decline in the general price level. This in turn suggests that those industries which grew so rapidly were the same ones which experienced declining prices for their products. A brief examination will confirm this.

7.1 Railroads

Let us first consider the railroads. Nuch has already been said about the involvement of the banks in financing the expansion of the railroads during the years of deflation: so that the periodic financial difficulties of the railroads contributed greatly to the recurring bank panics of this period. This by itself was enough to give the railroads a position of paramount importance during these years.

But this was not the extent of the railroad's influence in this period. It was pointed out in Chapter IV that regulated industries, which were thoroughly dominated by railroads for most of this period, accounted for more than half of all capital formation from 1880 to 1900. It might be argued that the huge flow of capital to the railroads acted as a drag on the rest of the economy by reducing the amount of capital available for investment in other industries. Put it is certainly true that the great demands of the railroads for capital gave great impetus to the financial institutions and techniques of financing which later played an important role in American industrial growth.

Railroad construction began in earnest in the 1850's, but new construction during the i860'3, affected by the Civil 'Var, was only slightly larger than in the previous decade. It was in the next twenty years that the railroads dominated the American economy with their rapid growth and huge demands for capital.

	1340-1850	1850-1360	1860-1870	1870-1880	1880-1890	1890-1900
Total net new railroad mileage[1]	5,551	21,757	22,259	40,786	69,918	29,740

But concealed in the figure for track mileage operated is the intensity with which these tracks were utilized. As Table VII-1 indicates, the relative increase in railroad ton miles was almost three times as great as the relative increase in track mileage operated during the years 1873-1896. The

annual average rate of increase in track mileage operated was 4.[1] percent while the corresponding figure for railway ton miles was 4.[2] percent. This latter figure more accurately describes the rapid growth of the railroads during the years of deflation.

Accompanying this rapid expansion of the railroads were many important innovations which reduced costs and made possible the movement of large bulk cargoes. For example, the double box car, which greatly increased the size of freight cars, was developed in the 1870's. In the next decade came the development of refrigerated cars and special livestock cars. The automatic coupler, which became standard shortly after it was introduced, was perfected in the lo30's.

241

TABLE VII-1

RAILROAD TRACK MILEAGE OPERATED
AND FREIGHT OPERATIONS
1872-1900

Year	Mileage of Track Operated	Railway Ton Miles (billions of short ton miles)	Freight Revenue (thousands of dollars)
	(1)	(2)	(3)
1900	215,833	141.6	1,052,404
1895	194,559	85.2	732,183
1890[a]	166,703	76.2	734,802
1885	138,320	49.2	509,691
1880	93,262	38.4	467,749
1875	74,096	20.8	363,960
1872	66,171	17.0	340,932

[a]Two figures are available for 1890, one comparable to data before 1890, and the other comparable for data after 1890. The figures presented here for 1895 and 1900 are adjusted figures derived by taking the raios of the two 1890 figures and multiplying the original figures for these years by this ratio in order to make them comparable to the figures for 1890 and earlier.

Source: Cols. (1) and (3), Historical Statistics, Series Q15 and Q48, pp. 427,429, and Series Q27 and Q84, pp. 428, 431. Col. (2), Burns, Arthur F., Production Trends in the United States Since 1870, National Bureau of Econom-

[1]Davis, Hughes, and 'IcDougall, op. cit., p. 305. Source: Cols. (1) and (3), Historical Statistics. Series Q15 and Q4 8, pp. 427,429, and Series Q27 and Q 8 4, pp. 4 2 8, 431. Col. (2), Burns, Arthur F. , Production Trends in the United States Since 1870, National Bureau of Economics, New York:1934, Table 44, pp. 302-303*

[2]Courtney Robert Hall, History of American Industrial Science (New York: Library Publishers, 1954), p. 6 2.

Two figures are available for 1890, one comparable to data before 1890, and the other comparable for data after 1890. The figures presented here for 1895 and 1900 are adjusted figures derived by taking the raios of the two 1890 figures and multiplying the original figures for these years by this ratio in order to make them comparable to the figures for 1890 and earlier.

a train of this size traveling at such a speed would have required five hand brakers and a distance of 1500[3] feet to come to a halt.

Perhaps the most important of the railroad innovations pertaining to the period of deflation was the development of the steel rail. This development came about after the Bessemer process for steel making took hold in the 'J. S. Although the Bessemer process was developed in 1855, it wasn't until 1867 that the[4] first American steel rails were produced. The importance of the steel rail to the development of the railroads can hardly be overemphasized. According to one noted observer in 1897:

> It is doubtful if the railroads could ever have become effective competitors. . . without steel rails, for the latter, although of transcendent importance in themselves, became doubly significant because of the advance along various lines that they made possible. The greatest of these improvements was made in the rolling stock. With stronger tracks much heavier engines could be built and cars could be loaded more heavily. Steel was in a large measure substituted for iron in the construction of locomotives; a great saving was made by the change from iron to steel tires. With a very slight increase in the dead weight of cars, the carrying capacity was doubled.**-

The years of deflation were years of growth and important innovation for the railroads. All of this led to greater efficiency and lower costs in railroad transportation.

As has been stated before, there are no accurate figures to indicate the path followed by the prices charged by the railroad industry. Nevertheless, rough indications of the course of railroad price movements can be gleaned from Table VII-1 and Chart VII-1.

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[3]Ibid., p. 40.

[4]George Tunell, "Transportation on the Great Lakes of North America," *Journal of Political Economy*, IV (June, 1896), 341-42.

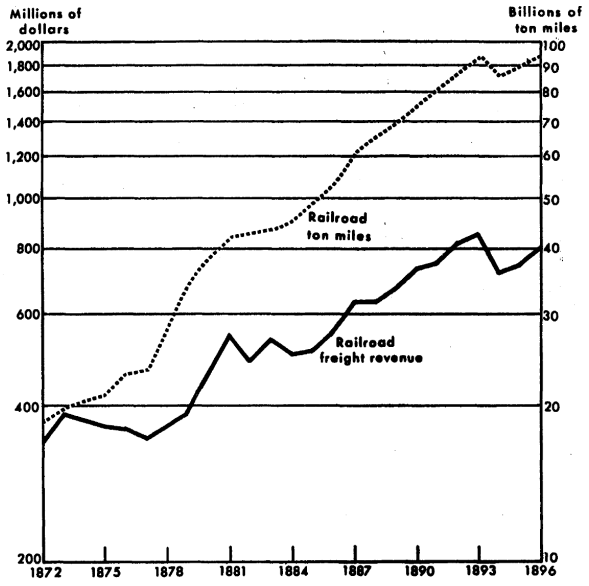

Chart VII-1. Railroad Freight Revenue and Ton Miles, 1872-1896.

Source: Railroad Freight Revenue, Historical Statistics; Ton Miles, Arthur F. Burns, Production Trends in the United States Since 1870 (New York: National Bureau of Economic Research, 1934).

mile even if there were no change at all in prices. Nevertheless, it is highly unlikely that such factors could account for a decline of more than half in freight revenue per ton mile. Admitting that the figures on revenue and traffic are themselves tenuous, it still seems safe to say that the prices charged for railroad freight, like prices in general, declined substantially during the years 1873-1896 while the railroad industry, again like the overall economy, was expanding rapidly.

7.2 Metals and Petroleum

The production of metals increased vastly in the years 1873-1896. Shipments of pig iron increased by 233 percent in these years, an increase greater than that in total output. During the same 3/ears, the average price per long ton of pig iron fell 7k percent. The decline in pig iron prices was greater than our maximum estimate of the decline in all prices. As Chart VII-2 shows, there was a rapid increase in both output and prices in the years 1899 and 1900. The big upsurge in output actually began after 1896, with shipments in 1900 showing an increase of 6 0 percent over those in 1896. Pig iron prices, though, declined through 1893. The big surge in output after 1896 can be explained by the development of the iron ore deposits of the great Kesabi Range at that time.

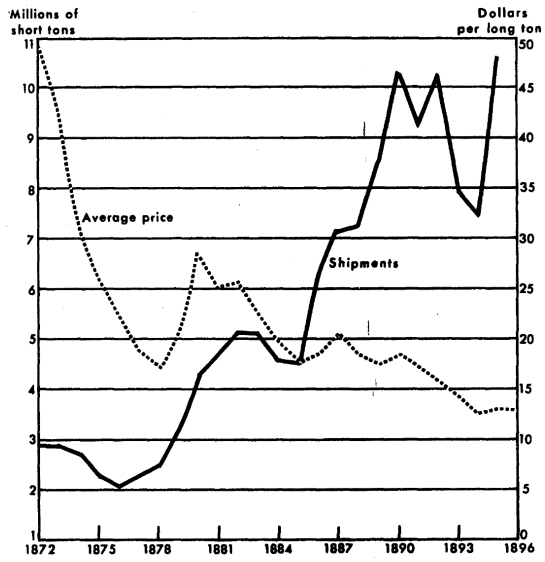

Chart VII-2. Pig Iron Shipments and Average Price, 1872-1896.

Source: Historical Statistics.

Copper production increased more than three times as fast as total product during the years of deflation. The increase during these years was about 1,543 percent. While this extraordinary increase in copper output was taking place, copper prices, too, were following a pattern generally similar in movement to that of all prices, but with a more rapid decline.

Lead output increased by about 1,000 percent during the years of falling prices. Prices of pig lead fell about 52 percent over the whole period, just a little more than the maximum estimate of about 50 percent for all prices, with the greatest price decline occurring in the period 1873-1879, when the increase in output was greatest.

The pattern of output and prices for zinc also showed a similar movement. A rapid increase of output of 945 percent for the period 1873-1896 was accompanied by a general decline in prices of about 43 percent from 1876, when the price series begins, through 1896.

A rapid increase in output in the presence of a general decline in prices is demonstrated also in the case of the petroleum industry. Output of crude petroleum increased at an average annual rate of almost 10 percent in the period of deflation. Price data for petroleum during this period is lacking, but the average value of the petroleum at the well, while subject to variations caused by other factors than price, should indicate the course of prices in these years. Chart VII-3 indicates the extent of the general decline in petroleum prices. The average value at the well in 1896 was alnost 75 percent lower than the value in 1873> although 1896 was not even close to the lowest average value in these years.

7.3 Manufacturing

There are few lines of manufactured output for which both price and quantity data are available for the years of declining prices. One industry for which such data is available is the iron and steel industry. This industry is an excellent one to examine because of its central role as a supplier of raw materials to[5] many other industries, and because of the key role it plays in furthering the processes of industrialization.

[5]Hall, on. cit., p. 39.

The steel industry in the United States was virtually born during the years of deflation that have been described as years of economic stagnation. In 1873, when prices began to fall, the steel industry was a full fledged giant, and the antecedents of the United States Steel Corporation, formed just a few years later, had been established.

The growth and evolution of the steel industry can be seen from the figures in Table VII-2. The output of steel ingots and castings increased percent in the period 1873-1896. The tremendous growth of the steel industry from 1873 was only a continuation of extremely rapid growth that began before 1873 and continued after 1896.

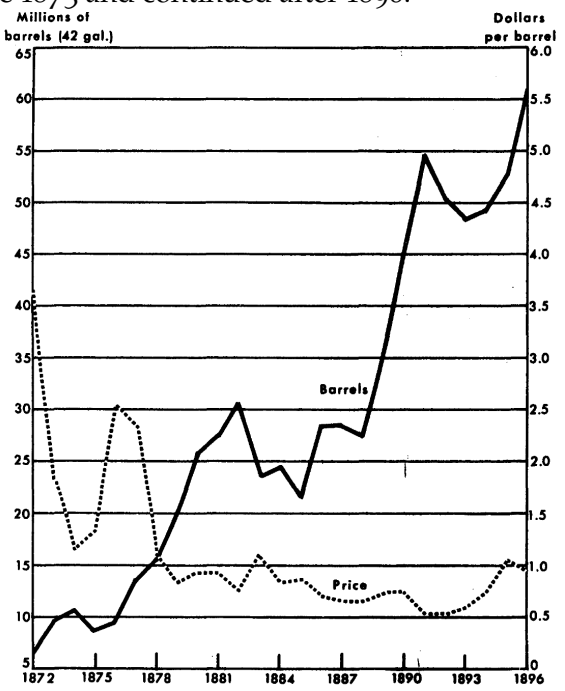

Chart VII-3. Output and Average Value at the Well, Crude Petroleum, 1872-1896.

Source: Same as Chart VII-2.

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TABLE VII-2

OUTPUT OF STEEL INGOTS AND CASTINGS, 1873-1896

(Long tons)

Year	Total	Bessemer	Open Hearth
1896	5,281,689	3,919,906	1,298,700
1890	4,277,071	3,683,871	513,232
1884	1,550,879	1,375,531	117,515
1878	731,977	653,773	32,255
1872	142,954	107,239	2,679

Source: Historical Statistics, Series P 203-205, pp. 416-17.

The total increase in output for the thirty year period beginning in 1870 and ending in 1899 was about 34,000 percent. In contrast, the following thirty years, 1900-1929, saw an increase in output in the steel industry of about 454 percent.

This era of declining prices saw not only a great increase in output, but also great changes in steel making technology. Henry Bessemer discovered the steel making process named after him in 1855* The Pessener process made possible the production of steel in half an hour that formerly required almost three months.[6] The widespread use of this process was delayed in the U. S. for more than a decade by patent disputes. In 1866 the patent disputes were settled and in 1867 the steel rails made in the U. 3. were poured from Pessener converters. In 1869, only about one-third of total output utilized the Bessemer process. In 1879, about 39 percent of steel output came from Bessemer converters. By 1896, the relative importance of the Bessemer process in steel production had declined somewhat, giving ground to the open hearth process. The open hearth process had been known as early as 1868, but refinements in this process had to be made to lower the cost of steel produced in this way. These refinements were made, and the open hearth process, which accounted for only a fraction of one percent of total output as late as 1879, accounted for more than The impetus for increased steel output came first from the demand for steel rails. Since the) figures on rails in Table VII-2 include both iron and steel rails, they do not indicate the full extent of the increase in production of steel rails for the early years of the decline in prices. After 1832, the manufacture of iron rails almost ceased completely.[7] But it was in those years prior to 1872 that the demand[8] for steel rails provided such a great stimulation to the steel industry. As Table

[6]H. T. Newcomb, ojp. cit. , 465.

[7][chart data, omitted]

[8]Hoffman, ojc. cit., 145.

VII-2 shows, it was not until 1832 that total production of steel ingots and casting surpassed the production of iron and steel rails combined. It may thus be inferred, at least for 1832, and in all probability for earlier years of the deflation, that practically all of the steel output was devoted to steel rails.

It is clear that after 1832, the growth of the steel industry did not completely depend on the demand for steel rails, but that the growth of industry output far outstripped the demand for steel rails. But it is equally clear that in the decade of the 1870's, part of the crucial formative years of the steel industry, the growth of this industry was tied to the growth of the railroad and the demand for steel rails. The links between these two industries are clear. In 1830, only about 29 percent of total track mileage was steel. In 1896, this figure had increased to more than[9] 83 percent.

At least for the years 1873-1832, the price of steel rails can be regarded as the price of steel. After 1832, other steel products became progressively more important. Nevertheless, the price of steel rails should be indicative of prices in general in the steel industry, since even in 1896 they composed more than 20 percent of total steel output, and a considerable larger percentage of total output for earlier years. Chart VII-4 shows that the rapid increase in steel output occurred in the presence of a very large decline in prices.

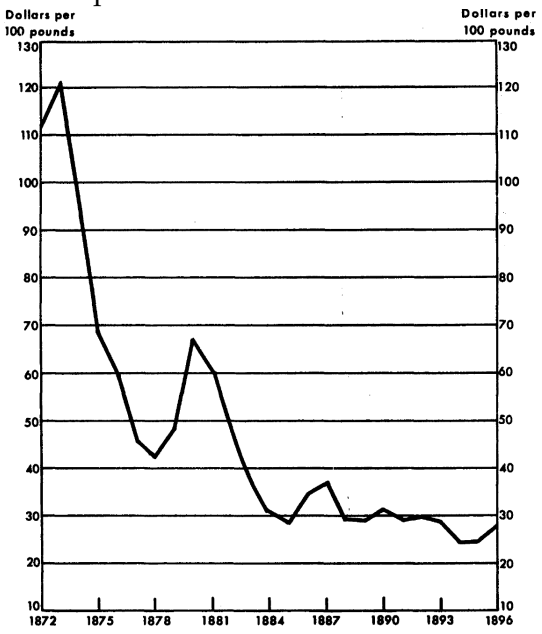

Chart VII-4. Price of Steel Rails, 1872-1896.

Source: Same as Chart VII-2.

proceeded at an average annual rate of 5.[10] percent.

Of course it is not surprising that prices declined in a new industry which was undergoing important changes in technology. The timing of the price changes in steel rails, though, was similar to the timing of the price changes in the general price indexes that have been examined. This indicates that the steel industry was subject to the same general influences on prices as the rest of the economy, which would be expected. The magnitude of the decline in steel prices was undoubtedly influenced by variables peculiar to that industry, but it is reasonable to assume that these forces worked in addition to the general deflationary forces in the economy, and thus intensified rather than caused the decline in steel prices.

[9]Calculated from Historical Statistics, op. cit., Tables -171, -'176, p. 355.

[10]Calculated from Ibid., Table 313, p. 506.

Public Utilities

One more notable feature of economic growth during the period of secular deflation was the development of new sources of mechanical power. Especially prominent was the development of electric power. Construction on a hydro electric station at Niagara Falls was begun in 1879• The production and consumption of electricity proceeded at a rapid pace in the succeeding two decades. In 1834, the first electric trolley appeared in Kansas City, and then was introduced in Richmond in 1833. In the early 1890's, when financial problems in the railroads contributed to a cyclical downswing in the economy, investment in electric street railways was increasing rapidly. According to Hoffman, investment in electric street railways in the years 1893-1893 was only slightly less than investment in agriculture.

The course of prices of electric power for the years of deflation is uncertain. Present price data does not extend back to those years. But data on production and consumption of electricity from water power extends back to 1890, and shows a ten-fold increase in both for the years 1890-1900. For the years 1890-1895, the increase in production and consumption of electricity from water power was threefold. The total horsepower of electrical central stations stood at 260,000 in 1839, and by 1899 was 2,134,000, an increase of 721 percent.

The highly important development of the use and production of electrical energy began and grew rapidly during the last ten or fifteen years of falling prices. Underlining this rapid growth was the establishment in 1892 of Ceneral Electric Company. But as we have seen, this was only a part of widespread economic growth in the presence of steadily declining prices.

Financial Institutions

The growth of financial institutions during the years of deflation should also be noted. The growth of commercial banks has already been mentioned. Among other financial institutions, the growth of life insurance companies was especially impressive. The assets of life insurance companies increased by 271 percent in the years of deflation, outstripping the growth of the economy. Their assets increased from about.*!'33 5,000,000 in 1872 to only vl,200,000,000 in 1896.

Stock markets had been established in the!J. 3. before the Civil V'ar, but achieved especially rapid growth after 1836. This growth of the stock market coincided with the growth of big business.

The growth of these financial institutions coincided with the great growth in capital formation of the years of deflation. These institutions must have contributed greatly to the mobilization of savings needed for that capital formation.

Chapter 8

Real Wages and Income Distribution

After examining the behavior of prices and output in the years 1873-1896, there can be no doubt that the United States experienced a sustained period of extremely rapid and pervasive economic growth accompanied by a deep secular decline in the price level. It has been pointed out that the phenomenon of these two events occurring together has been considered so unlikely that the term deflation has come to be synonymous with the term depression. This was true during the time in which this rapid growth and deflation occurred and has remained true up to the present time. We must turn now to the question of what factors were present in the American economy at this time which permitted rapid growth in the presence of declining prices. In what follows, Chapter II will be referred to frequently.

It is not enough to say that prices had to decline while output increased so rapidly so that the increased volume of goods could be taken off the market, or that prices in the non-farm sector of the economy[1] had to fall so that demand would shift away from agriculture and absorb the large increases in industrial output.[2] Such statements, while they may be true, take as given the rapid increase in output, and starting with this assumption, explain other events, such as the decline in prices, as consequences of the rapid growth. The reasons for the declining price level have already been examined, and it was shown that the great increase in output played one of the key roles in the deflationary process. But the more fundamental question which, must be posed is why, in light of the discussion in Chapter II, the United States achieved what is perhaps the most rapid sustained growth in its history during a period in which prices fell rapidly.

It is assumed that in a free market economy producers expand output in response to the profit motive. Output may be increased initially in response to expected future profit, but if this expected profit does not in fact materialize, then the firm will cut back production. In the long run, unless the situation is reversed so that profits are realized, the firm will fail. It will be recalled now that it is through its potentially destructive effects on profits that the belief that deflation and economic growth are utterly incompatible has gained widespread, if not almost universal, acceptance. What effect did deflation have on profits in the years 1#73-1896?

[1] D. A. Wells, on. cit., p. 205.

[2] Taussig, op. cit., p. 111.

8.1 Profits

We have thus far said nothing about the behavior of profits during the years of falling prices. No specific data on amounts or rates of profits in this period are available. Nevertheless, something about the course of real profits during these years can be inferred.

First, the extraordinarily rapid increase in output suggests by itself that for the period as a whole, real profits were substantial. That is, it is difficult to conceive of a very rapid rate of increase of output continuing over a twenty-four year period in the face of losses incurred by producers. Such a phenomenon might occur over a brief period, but certainly producers would not continue to incur losses, nor would repeated losses generate expectations of future gain that would sustain rapid growth over almost a quarter of a century.

The behavior of profits should also be reflected in the rate of capital formation. The act of investing in capital equipment may be done in response to a number of things, so that capital formation may be a function of such variables as sales volume or the rate of interest, but these variables in turn affect the expected profitability of the capital investment. Fundamentally, then, capital formation occurs in response to expected profits generated by that investment. The expectation of future profits, in turn, would be heavily influenced by actual past profits, since past events are a major determinant shaping expectations of the future. The failure of these profits to materialize would be expected to act as a deterrent to additional investment in capital goods.

As would be expected from the great increase in output, capital formation also increased rapidly while prices were declining. The extremely high proportion of GNP devoted to capital formation has already been mentioned. During the years 1873-1896, gross capital formation increased at an average annual rate of 5.[3] percent. Gross capital formation thus increased even more rapidly than GNP in these years. As Chart VIII-1 shows, capital formation increased most rapidly in the years 1873-1830 and 1837-1890. The timing of changes in capital formation were similar to those for GNP, again as might be expected. Chart VIII-1 shows this similarity.

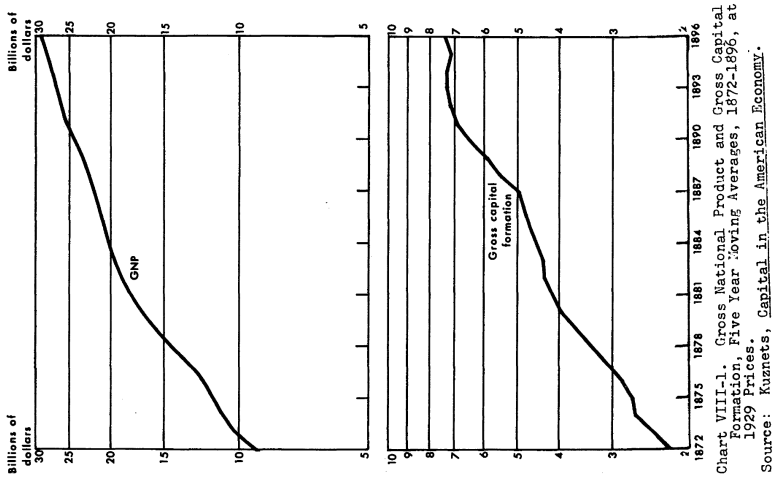

Chart VIII-1. Gross National Product and Gross Capital Formation, Five Year Moving Averages, 1872-1896, at 1929 Prices.
Source: Kuznets, Capital in the American Economy.

[3]Ibid., pp. 112-13. "See, for example, Dudley Dillard, Flconomic Development of the North Atlantic Commun itv T Engle-wood Cliffs, New Jersey/: Prentice Hall, 1967), pp. 390-91, and Geoffrey Maynard, Economic Development and the Price Level (London: Macmillan and Companv Ltd., 1962), p. 131.

Formation, Five Year Iloving Averages, 1872-1896, at 1929 Pricss Source: Kuznets, Capital in t ^ Ameri can Economy.

Since the growth of capital formation proceeded more rapidly than the growth of GNP during; the period of deflation, the capital-output ratio in the economy increased in these years. As Table VIII-1 shows, the capital stock per capita and per member of the labor force also increased while prices were declining.

TABLE VIII-1

GROSS AND NET CAPITAL STOCK PER CAPITA AND PER MEMBER OF LABOR FORCE, 1869-1899
(Stock in thousands of 1929 dollars)

Year	Capital Stock Per Capita		Capital Stock Per Member of Labor Force	
	Gross	Net	Gross	Net
1869	1.12	.68	3.52	2.11
1879	1.42	.85	4.16	2.49
1889	1.86	1.09	5.22	3.06
1899	2.53	1.44	6.66	3.79

Source: Kuznets, Capital in the American Economy, Table 3, p. 64.

In examining interest rates during the years of

Source: Kuznets, Capital in the American Economy, In examining interest rates during the years of deflation we encounter a scarcity of data once again. Yields on American railroad bond issues are available along with yields on New England municipal bonds. These are shown together in

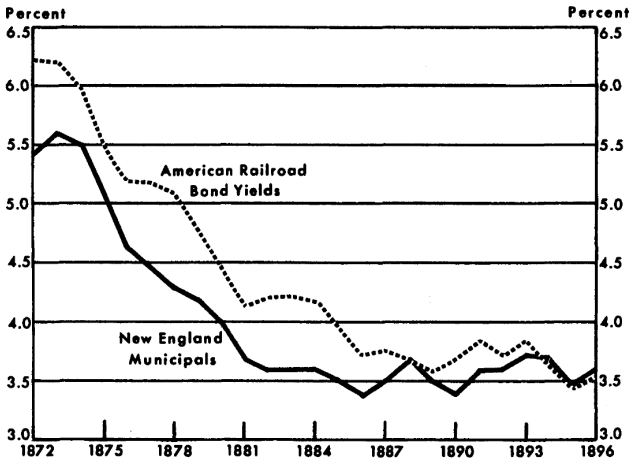

Chart VIII-2. Yields on American Railroad Bonds and New England Municipal Bonds, 1872, 1896.

Source: Same as Chart VII-2.

American Railroad New England

New England Municipal Bonds, 1872, 1896. Source: Same as Chart VII-2.

the railroads encountered problems in these years which seem to have made them the center of the periodic financial panics of these years, yields on railroad securities displayed movements similar in timing and magnitude to those of the New England municipal bonds.

Nominal interest rates declined rapidly in the years 1873-1879 when prices were dropping rapidly. This decline in interest rates tended to offset the effect of the declining prices on the real rate of interest. Capital formation remained strong throughout these years.

The rate of decline in prices was greatest in the years 1873-1879 and 1832-1835 or 1856. The nominal rate of interest fell in these years, adjusting to the rapid rate of deflation. After 1836 the rate of price decline slowed while the nominal rate of interest showed little change. This indicates that the real rate of interest was lower after 1836 than before. Insofar as capital formation responds to changes in real interest rates, this would have meant, ceteris paribus, an increase in the rate of capital formation after 1886. This in fact occurred. As was pointed out in Chapter V, the share of capital formation was larger in the period 1889-1893 than in any other ten year period during the years of deflation, starting with the years 1869-1873.

Chart VIII-3 gives an indication of real interest rates in this period. These figures were derived from the formula in Chapter II which showed that an approximation of real interest rates nay be obtained by subtracting the rate of price change from the nominal rate of interest. Rates of change in prices from year to year according to the Burgess Price index were calculated and subtracted from the yields on American railroad bonds.

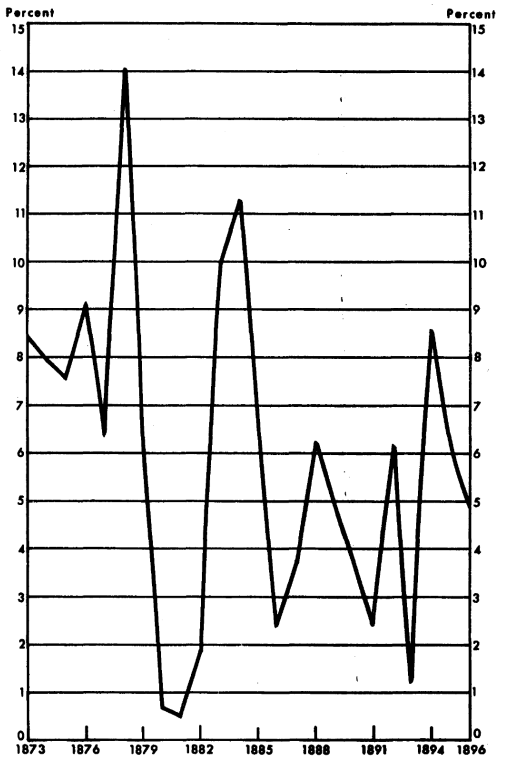

Chart VIII-3. Real Yields on American Railroad Bonds, 1873-1896.

Chart VIII-3 indicates that real interest rates fluctuated extensively during these years. This would be expected in light of the irregular price fluctuations in these years. Although Chart VIII-3 gives only the roughest sort of estimate of real interest rates, it indicates that on balance they declined over the period of deflation. It also supports our observation of the expected level of real rates after 1836. The general behavior of real rates as shown in Chart VIII-3 is compatible with the theoretical model developed in Chapter II.

The behavior of output and capital formation suggests that profits were substantial throughout the period 1873-1896. A slackening in the rate of increase of GNP and capital formation in the years

1831-1837 and 1891-1895 or 1896 similarly suggests that profits may have also fallen off somewhat in those periods.

This view of the behavior of profits is reinforced in general by the relative movements in stock prices during this period. Itovements in stock prices relative to other prices should reflect the supply and demand factors in the stock market. These supply and demand factors, and thus stock prices, should be influenced greatly by the profitability, or at least the expected profitability, of firms whose shares are traded in the stock market. Because the supply and demand for stocks are affected in the short run by expectations which may or may not be realized, movements in stock prices would be expected to show greater volatility. Nevertheless, the general movement of stock prices relative to other prices should reflect the attitudes of investors toward the profitability of firms.

Chart VIII-4 shows the movement in the prices of industrial common stocks relative to two general price indexes, the Warren-Pearson index and the Burgess index. Of the four general price indexes for the years 1873-1876 that have been examined, it will be recalled that the Burgess index showed a lesser decline in prices than two others, while the Warren and Pearson index showed the greatest decline.

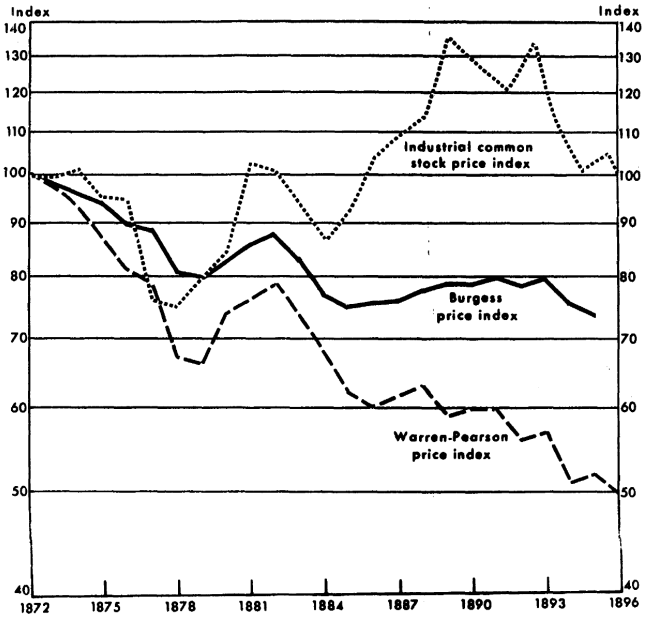

Chart VIII-4. Industrial Common Stock Prices and Two General Price Indexes, 1872-1896.

Source: Industrial Common Stock Prices and Burgess Price Index, Historical Statistics; Warren-Pearson Price Index, Warren and Pearson, Gold and Prices.

For the years 1873-1876, industrial stock prices fell less than both the Burgess and Warren and Pearson indexes. In 1877, stock prices fell precipitously to a point below the two general price indexes.

Chart VI11-4. Industrial Ccnr.on Stock Prices and Two General Price Indexes, 1572-1896. Source: Industrial Common Stock Prices and Burgess

Price Index, Historical Statistics; tfarren-Pearson

Price Index, Warren and Pearson, Gold and__Prices..

After 1579, the stock price index remained well above the general indexes.

The great decline in stock prices in 1877 can probably be explained by the steps taken in that year by Secretary of the Treasury John Sherman to accumulate gold in anticipation of the resumption of specie payment in January, 1879. A short review is in order here. These were the first steps taken by the government which showed an actual determination to accomplish resumption. Once it was ascertained that resumption was actually to be attempted, the grave doubts which were expressed about the prospects of success must have generated pessimistic expectations for the future which were dispelled once and for all only in 1879, xvhen resumption was actually accomplished. Stock prices fell only slightly in 1873, the year in which the persistent outflow of gold was reversed, making successful resumption more of a likelihood.

While stock prices showed more extreme variations in both upward and downward directions, they showed no real absolute downward movement at all over the entire period, but actually increased relative to all prices. This behavior of stock prices in general does not coincide with the view that deflation was destructive to profits. To the contrary, it suggests that profits for the most part were substantial. It is difficult to conceive of the expectation of profits, never realized, maintaining stock prices at a substantially higher level than other prices.

With the possible exception of the two years just prior to resumption in 1879, the behavior of stock prices suggests that profits either declined or failed to increase as rapidly as previously in the years 1830-1836, when stock price movements paralleled the movement of all prices, and again from 1839 or 1890 through 1896. This is the same'general view of profits obtained by inference from the behavior of GNP and capital formation.

Accepting the conclusion that profits during the years of deflation must have been at a relatively high level, or at least remained at a level high enough to stimulate a sustained increase in output and in capital formation at historically high rates, does not mean that the conclusion that deflation was not a deterrent to profits and economic growth must also be accepted. It is possible, and something which must be considered, that profits would have been higher and growth more rapid in the absence of a declining price level.

8.2 Productivity

It was shown in Chapter II that increases in productivity alone could partially or more than offset the effect of a declining price level on profits, depending on the extent of the increases in productivity, and the changes in wages and prices. Implicit in this argument is the proposition that even if profits actually increase, they still would not he as high as they would be in the absence of deflation. If the rate of growth of output is related to the level of profits, it follows that even if productivity increases offset to a greater or lesser extent the effect of the decline in prices on profits, growth of output would have been more rapid in the absence of deflation, and the argument that deflation retards growth would still be valid.

It is to increases in productivity that most of those who have attempted to explain the phenomenon of rapid economic growth accompanied by falling prices in the years 1873-1896 have turned. This was largely the explanation of contemporary observers.' It has no less been the explanation of modern writers. Of the contemporary economists, Wells said:

> Such, also, is a summary of the evidence in support of the view that this recent phenomenal decline in prices is due so largely to the great multiplication and cheapening of commodities through new conditions of production and distribution, that the influence of any or all other causes combined in contributing to such a result has been very inconsiderable, if not wholly inappreciable.

Taussig stated the case for productivity even more succinctly. He said:

> Put what the world in fact has seen has been the complex case of a fall in prices accompanied by great improvements in production. The business man and capitalist has had, to be sure, to deal with falling prices: but the sane amount of capital and labor has turned out more commodities than before; and his total money returns, so far from declining, have generally increased. The money incomes of the managers of industry have shown the same upward movement as the money incomes of other classes in society. So long as this is the case, it is idle to talk of a depressing effect on enterprise from the fall in prices, or a strangling of the industrial organism from insufficiency of the circulating medium. In fact, the immediate cause of the fall in prices has been the pushing on the market for sale of larger and larger quantities of commodities, produced with profit at lower and lower cost: a state of things fortunate for the community, and surely not depressing for the business man. 3

Taussig credits the increases in productivity to new processes, labor-saving inventions, larger scale business enterprises, and improved machinery, all of which make for a more efficient division of labor. In agriculture, he felt, the main source of increased productivity was the opening up of new lands. Business failures, according to Taussig, occurred when firms failed to keep up with the pace of technological change.[4] Among the more recent writers, Weber and Handfield-Jones stress the role of productivity due largely to innovations emobdied in capital equipment, but also due to shifts in the labor force from sectors of low productivity to sectors of high productivity.[5] Maynard also stresses the role of productivity, but as part of a more elaborate model. According to Maynard, the rapid growth in the r J. S. during the deflation was due to differential rates of increase in productivity in agriculture and manufacturing, with the most rapid increase in productivity occurring in agriculture. This resulted in falling prices in agriculture and a lower cost of living for the entire economy. This lower cost of living in turn allowed increases in productivity in other sectors to be manifested in the form of falling prices.

Ozga and Phelps-Brown offer an explanation for the presence of growth in the presence of deflation similar to that of Maynard, stressing differential 7 rates of growth in the various sectors of the economy. They differ from Maynard in stressing the relationship of the rates of growth in the industrial sector and in the primary products sector. When the primary products sector grows more rapidly than the capacity of the industrial sector, the price of primary products, and thus the price of finished goods, will decline. Underlying the more rapid growth of the primary products sector is the more rapid increase in productivity occurring there.

Looking to increases in productivity as the factor permitting growth with deflation in the period 1873-1896 is intuitively appealing. There was a relative shift in labor from agriculture to industry, a shift of labor from a sector of lower productivity to one of higher productivity. These years were also years characterized by rapid technological change, and some of the ma.ior innovations brought forward during this period have been mentioned. The rapid increase in capital, both in absolute terms and per capita, has also been documented. All of these changes should have resulted in

[4]Average of decade 1879-1839 Source: Kendrick, Productivity Trends in the United States, Col. (1) Table A-XIX, p 328: Col. (2). Table,Brl, p. 362: Col. (3), Table D-I, p. 464: Col. (4), G-I, p. 540.

[5]Gallman, on. cit., p. 33.

higher productivity. The question though, is not whether productivity increased in these years, but whether the increase in productivity was great enough to counteract the declining prices. This, of course, can only be answered by an examination of the quantitative changes in productivity during the period of declining prices.

Table VIII-2 provides an indication of the magnitude of changes in productivity in the economy according to Kendrick as measured by what is probably the most common measure of productivity, output per manhour. Annual data on output per manhour is not available for the 1870's and 1830's. For the years 1874-1834, productivity increased by just under 3 percent per year, as roughly measured hv taking the decade averages for 1869-1873 and 1879-1833 as initial and terminal years. Centering the average for 1869-1878 on 1874, the average annual increase in the years 1875-1899 was about 2 percent.

on 1874, the average annual increase in the years 1875-

1899 was about 2 percent.

TABLE VIII-2

OUTPUT PER MANHOUR: NATIONAL ECONOMY AND SELECTED INDUSTRIES, 1869-1899
(1929 = 100)

	1869 (1)	1879 (2)	1889 (3)	1899 (4)
National Economy	33.0[a]	44.8[b]	43.6	54.7
Transportation	17.1	25.5	33.4	45.0
Farm Segment	61.0	72.2	77.0	87.9
Manufacturing	28.2	31.1	39.4	45.5

[a]Average of decade 1869-1879

[b]Average of decade 1879-1889

Source: Kendrick, Productivity Trends in the United States, Col. (1) Table A-XIX, p. 328: Col. (2). Table B-1, p. 362: Col. (3), Table D-I, p. 464; Col. (4), G-I, p. 540.

aAverage of decade 1869-1879 For manufacturing, the increases in productivity were even smaller. In the years 1870-1899, the average annual rate of increase in output per manhour was only about 1.[6] percent. The average annual increase in the years 1870-1879 was even smaller. The most rapid increase, an average annual rate of 2.1+ percent, occurred in 1830-1839.

Oallnan's figures on output per gainful worker serve as a rough check on Kendrick's figures and confirm Kendrick's results. Gallman's estimates constructed directly from data on value added per worker shoitf an average annual increase of output per gainful worker of 1.[7] percent for the years 1870-1899, or approximately the same as Kendrick's figures. Gallman shows the most rapid increase in output per gainful worker as taking place in the decade 1830-1839.

[6]D. A. Wells, op. cit., p. 86.

[7]*Barron's*, XLIII (October, 1933)> 7* Source: Warren and Pearson Hourly Wage Index, Warren and Pearson, Gold and Prices; Barron's Hourly Wage Index, Barron*s. XL111 (October, 1933).

Now it is not possible to tell from Kendrick's figures for the 1870's and 1880's, since they are decade averages, exactly what the relative movements of output per manhour were in those years. Kendrick's figures for manufacturing and Gallman's estimates indicate that productivity gains in the 1830's may have been more rapid than those of the 1870's. But other figures will be presented below which indicate that productivity increased more rapidly in the 1370Ts than in the 1830's. This would be in accord with modern observations that productivity increases most rapidlv when output is increasing most rapidly. The view also accords with unpublished figures of the National Bureau of Economic Research. We shall mention this point later.

The figures which have been presented on productivity, in historical terms, are not particularly high. Indeed, in view of the opinions of both contemporary and modern writers, the increases in productivity of this period are surprisingly low. Put when compared with the estimates of the decline in prices presented in Chapter IV, it can be seen that for the entire period 1873-1896, the annual increase in productivity of about 2 percent might have been high enough, give the assumption that money wages did not increase, to offset the effect of the decline in prices on profits.

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TABLE VIII-3

AVERAGE ANNUAL PERCENT RATE OF PRICE DECLINE

	Warren and Pearson	Federal Reserve Bank of New York	Purgess	Hoover-Long-Rees
1873-1896	2.7	1	1.2	1.7

Only the Warren-Pearson index shows a decline in prices greater for the entire period than the increase in productivity. The Hoover-Long-Rees index shows a decline in prices so close to the increase in productivity, though, that even with no increase in money wages, it is doubtful if the increase in profits due to the productivit3r change in excess of the price decline would have been great enough to spur the economy to the rapid increases in output which actually occurred.

When the sub-period 1873-1879 is considered, doubts about productivity as the main factor permitting growth and deflation are increased. Annual productivity increases for these years were something less than 3 percent, yet only the FRRNY index shows a price decline of less than 3 percent for these years. Yet it was in these years that the most rapid increases in output of the entire period occurred.

Increases in productivity during the period of deflation were not unusually large. Indeed, they were less than the increases in productivity of recent years, when the belief in the conflict between even stable prices and economic growth is strongly adhered to by many. They unquestionably contributed to the ability of the economy to grow in the midst of deflation, but it is clear that we must look further for the key to this experience.

:Oney Wages

The central role of flexible money wages in insulating an economy against a declining price level was examined in Chapter II. Even the extent to which a declining nominal rate of interest or increasing levels of productivity can offset the effects of a declining price level depends on the behavior of money ivages. This was pointed out above in our examination of productivity during the deflation of 1873-1896. After examining other important factors, the course of money wages in this period are thus of paramount importance, just as they are in the classical model.

Curiously enough, contemporary writers seem to have had little to say concerning wages during the years of deflation. Wells mentioned only in passing that wages had fallen in only "a few special depart-^ ments."

The same difficulties exist for wage data in these years as have already been described in conjunction with the series on output and prices. It is particularly difficult with regard to wages to find uniform estimates which cover the entire period. To avoid obvious problems involved in splicing together different series, two sets of money wage estimates which cover the entire period and the major sectors in the money wage economy vail be relied on here to present a picture of money wages in these years.

One of these sets of wage indexes was prepared by Warren and Pearson and was presented at the same time as their price indexes. The other wage index was prepared by BarronTs These two indexes are compared in Although they do not conform exactly in this respect, the differences for the most part are not great.

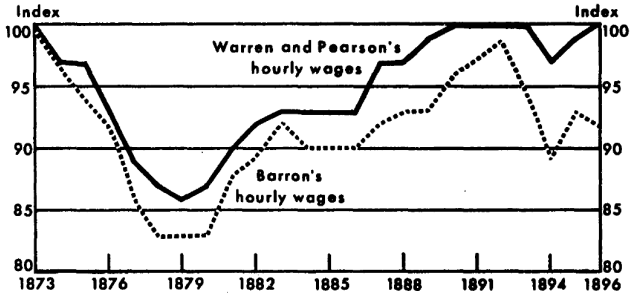


Chart VIII-5. Comparison of Two Hourly Wage Indexes, 1873-1896.

Source: Warren and Pearson Hourly Wage Index, Warren and Pearson, Gold and Prices; Barron's Hourly Wage Index, Barron's, XLIII (October, 1933).

TABLE VIII-4

COMPARISON OF TWO INDEXES OF HOURLY MONEY WAGES, 1873-1896
(1873 = 100)

Year	Barron's Hourly Wage Index (1)	Warren-Pearson Hourly Wage Index (2)	Year	Barron's Hourly Wage Index (1)	Warren-Pear Hourly Wa Index (2)
1896	92	100	1884	90	93
1895	93	99	1883	92	93
1894	89	97	1882	89	92
1893	94	100	1881	88	90
1892	99	100	1880	83	87
1891	97	100	1879	83	86
1890	96	100	1878	83	87
1889	93	99	1877	86	89
1888	93	97	1876	92	93
1887	92	97	1875	94	97
1886	90	93	1874	97	97
1885	90	93	1873	100	100

Source: Col. (1) Barron's, XIII, No. 43, October, 1933, p. 7; Col. (2) G. F. Warren and F. A. Pearson, Gold and Prices, p. 317.

On the other hand, the two wage series show differences concerning the magnitude of the changes in wages, although the differences here are not nearly as large as those shown by the price indexes. Despite the differences in the degree of changes in money wages, both indexes are in complete agreement on several important issues. They both clearly show that money wages exhibited substantial downward flexibility in the years 1874-1879, falling in each of these years, with the exception of a single year in which the Warren-Pearson index shows no change.

Finally, they both show that at no time in the years 1873-1896 did money wages exceed the level of 1873.

The Barron's wage index indicates a greater decline in wages in the 1870's than the Warren and Pearson index. For the years 1874-1880, Barron1s shows a decline in wages of about 17 percent. Warren and Pearson indicate that the decline in those years was about 13 percent. Long's index of manufacturing wages supports Warren and Pearson, showing a decline[8] of 12 percent in those years. On the other hand, data from the Aldrich Report indicate that the decline in wages was about the same as that shown by Barron's. The Aldrich Report shows that average daily wages declined by a little more than 15 percent in these first years of deflation.[9] At the same time it reports that average daily hours worked increased slightlj'-. The data used in deriving average hours worked, however, is very scanty. The average hourly wages would thus have declined by more than the decline in average daily wages.

[8] [chart data, omitted]

[9] [chart data, omitted]

'Mitchell criticized the processing of wage data from the Aldrich Report and presented his own estimates of average daily wages from 1860 to 1800, based on data from the Aldrich Report, in Gold, Prices, and Wages Gnder the Greenback Standard.[10] According to Hitchell, the decline in average daily wages in 1874-1800 was about 20 percent.

In the absence of anything to indicate that average daily hours worked decreased, it does not seem as if the Barron's wage index seriously overstates the decline in wages in the years 1874-1800. In these years, then, the average annual decline in money wages was probably in excess of 2 percent, and certainly not less than 1.[11] percent.

In the years 1801-1890, Barron's shows an increase in money wages of a little more than 15 percent. This figure is supported by a similar! increase shown by Warren and Pearson. Long, on the other hand, shows the increase to be almost 10 percent.[12] The increase reported in the Aldrich Report is a little less than that shown by Barron's Again, the Barron's. index occupies an intermediate position.

The course of money wages in the years 1891-1896 is less obvious even in regard to direction. Barron's indicates a downward trend for money wages in these years while Warren and Pearson show constant money wages through 1893> a decline in 1894, and then an increase in 1895 and 1896 back to the level of 1893* Paul Douglas's figures on money wages in these years show a pattern very similar to that of[13] Warren and Pearson.

Real Wages

How did these money wage movements contribute to economic activity in the years of deflation? A comparison of money wage movements and price changes is very revealing. Chart VIII-6 compares the Burgess price index with the Barro n 's wage index.

In the years 1873-1802, the decline and subsequent increase in prices were closely paralleled by money wage movements. There was thus substantial downward flexibility of money wages in these years. In fact, the wage flexibility shewn in Chart VIII-5 could be called in a sense more than completely flexible. For much of the time in this intermediate period, money wages either declined or rose less than prices. Over the years 1873-1832, real wages on balance might have actually declined! Calculated from the Burgess price index and the Barron's wage index, real wages in 1832 were about.[14] percent less than in 1874> but about the sane as they were in 1873* V'e cone to the surprising conclusion that in the years of n.ost rapid growth during the entire period 1873-1896, when real CTTP was increasing at an average rate of between 4.[15] and 7 percent, real wages night not only have failed to increase, but could actually have declined. How likely is it that real wages behaved in this manner? Our conclusion regarding a decline in real wages was derived from a comparison of the Burgess price index with the Barron *s wage index, and hence depends upon the validity of these indexes. The use of the Barron's index was explained above. Use of the Warren and Pearson price index in place of the Burgess index would have shown an increase in real wages, although not a large one. Using the Barron* s wage index along with the Warren and Pearson price index would have shown the real wage in 1832 to have been only about 10 percent greater than the real wage in 1873> or an

[10] [chart data, omitted]

[11] [chart data, omitted]

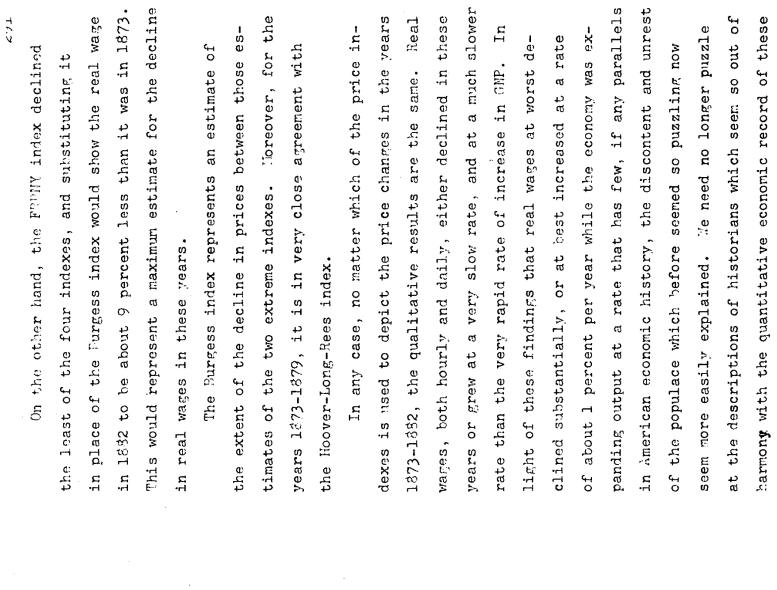
[12] Clarence D. Long, Wages and Earnings in the United States, 1860-1890 (Princeton: Princeton University Press, 1960), p. 153.

[13] Retail Prices and Wages, op. cit.

[14] Mitchell, Gold, Prices and Wages, op. cit., pp. 120, 145-52.

[15] Long, o p. cit.

increase at an average annual rate of about 1.[16] percent. This figure would represent a maximum estimate for the increase in real wages in these years.



On the other hand, the FRBMY index declined the least of the four indexes, and substituting it in place of the Burgess index would show the real wage in 1832 to be about 9 percent less than it was in 1873* This would represent a maximum estimate for the decline in real wages in these years.

The Burgess index represents an estimate of the extent of the decline in prices between those estimates of the two extreme indexes. Moreover, for the years 1873-1879, it is in very close agreement with the Hoover-Long-Rees index.

In any case, no matter which of the price indexes is used to depict the price changes in the years 1873-1832, the qualitative results are the same. Real wages, both hourly and daily, either declined in these years or grew at a very slow rate, and at a much slower rate than the very rapid rate of increase in ONP. In light of these findings that real wages at worst declined substantially, or at best increased at a rate of about 1 percent per year while the economy was expanding output at a rate that has few, if any parallels in American economic history, the discontent and unrest of the populace which before seemed so puzzling now seem more easily explained. Ye need no longer puzzle at the descriptions of historians which seem so out of harmony with the quantitative economic record of these years. The cyclical decline from 1873 to 1879 recorded bjr the Rational Bureau of Economic Research was a decline experienced by wage earners. The American economy was not depressed in this period, but ware earners were. Those workers who raised their voices in protest were not describing the depressed conditions of the economy, but were speaking for themselves. Their cries should have been interpreted in that light.

After 1832, money wages, which had increased[17] from 1879, remained constant or dipped slightly before beginning to increase in 1887. In the years 1883-1892, money wages failed to decline at all, either increasing or remaining constant (see Chart VIII-5).

[16]Retail Prices and Wages, o p. cit.

[17]Paul Douglas, Real Wages in the United States, 1890-1926 (Hew York: Houghton Mifflin Company, 1930).

Prices, in contrast, began a deep decline after 1882 that continued through 1885 or 1886 (see Chart[18] VIII-5, p. 282). The fall in prices was then broken and prices rose in 1887 and 1888. In the period 1839-1891 or 1892, prices showed very little, if any, downward trend. After 1891 or 1892, prices began another sharp decline that ended the long period of general deflation.

Chart VIII-6 shows these movements in prices and money wages clearly.

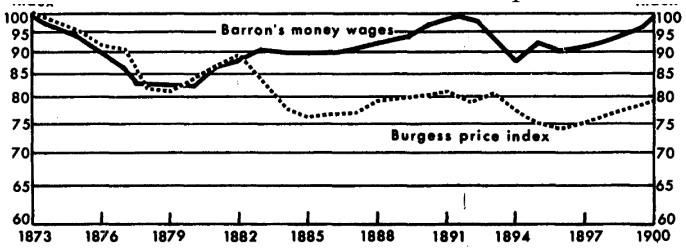


Chart VIII-7. Comparison of Barron's Hourly Wages and Burgess Prices, United States, 1873-1896.

Source: Same as Chart VIII-6.

1136 or 1817, real wages registered substantial gains. The slight downward trend in prices, if prices declined at all, in the years 1817 or 1831 to 1892, combined with the increase in money wages to produce a continued increase in real wages, although at a much reduced rate from the increases of 1832-1136. Calculated from the Burgess price index and Barron's wage index, the increase in real wages in the years 1813-1192 was about 25 percent. The increase in the period 1833-H17 was about 20 percent, while the increase for 1811-1892 was only about 5 percent, with half of this increase coming in 1192. i[19] The increase in real wages that began in 1113 was brought to a halt after 1892, and.real wages remained roughly constant in 1193-1196, and then declined slightly on balance until the end of the decade. In 1896, the dowm-/ard trend which both money wages and prices had followed was broken and both variables began a long term increase.

Income Distribution

If real wages increase by the same percentage amount as the percentage increase in productivity, the relative share of national income accruing to labor will remain constant, and the relative share of income accruing to all other factors combined will also remain constant. If real wages increase by a smaller relative amount than the increase in productivity, then labor's relative share in GNP will decline. Profits would thus increase in absolute amount even if GNP remained constant through a redistribution of income away from labor and toward profits. If the resulting relative and absolute increase in profits stimulated the growth of output, absolute profits would increase even more.

In what follows, there will be an attempt to ascertain roughly what, if any, changes in income distribution occurred during the years of deflation. Only two income shares, wages, representing the share in income of labor and profits, taken here to mean income accruing to owners of property, will be considered.[20] It must be kept in mind that the data used here, as most of the data for this period, may be subject to considerable error. No claim, then, can be made of precision in these estimates of changes in relative income shares. Perhaps the best that can be expected is that they will show the direction and rough order of magnitude of these shifts. For our purposes here, this is all that is necessary.

[18]This figure was derived by centering Kendrick' decade average estimate of output per manhour for 1869-1879 and 1879-1889, as shown in Table VIII-1, on 1874

[19]Edward C. Budd, "Factor Shares, 1850-1910," in Trends in the American Economy in the Nineteenth Century. op. cit., p p. 365-98.

[20]20 *wSee editor's comment on Weber and Handfield- Jones, oja. cit.

Centering Kendrick's decade average estimate of output per manhour for 1869-1879 on 1874, the increase in productivity from 1874 through 1899 was 66 percent. Using the Burgess price index and Barron's wage index, the increase in real wages during the same years was only about 24 percent. This indicates that there was a substantial shift in the relative shares in income of wages and profits away from wages and in favor of profits. In the years of deflation and rapid economic growth profits must have been increasing at a rate significantly faster than the rate of growth of output. For the period of deflation as a whole, this redistribution of income shares would have been a powerful spur to the growth of output. Far from the destruction of profits by a declining price level, the behavior of wages was such that real wage gains failed to keep pace with gains in productivity, resulting in enhanced profits, in terms of both absolute increase and increase of relative share of income. One of the results of the redistribution of income was an increased incentive to produce, which must have contributed greatly to the record economic growth of these deflationary years.

This shift in income in favor of profit did not proceed smoothly throughout the entire period. According to Kendrick, the increase in productivity during 18 the years 1874-1882 was roughly about 28 percent.

But this was the period when the probability is strong that real wages may have actually decreased. These years, it will be recalled, were marked by strong downward flexibility so that the decline in wages, when coupled with increased productivity, more than compensated for the decline in prices. The resulting shift in income toward profits and away from wages in these years was undoubtedly greater in magnitude than the shift for the entire period 1873-1896. The incentive to expand output resulting from the shift in income distribution would have been correspondingly greater in the years 1873-1882 than in the remainder of the period of deflation.[21] In the years 1883-1892, outpdt per manhour increased by approximately 17 percent. We have shown that real wages in these years increased by about 25 percent, with most of this increase concentrated in the years 1883-1886. This indicates that the redistribution of income in favor of profits that proceeded after 1872 was abruptly reversed for a time after 1882. In particular, it seems that the shift in income shares back in favor of wages occurred mostly in the years 1883-1887. To review briefly, wages, which had been increasing along with prices after 1879, continued their upward trend in 1883, while prices turned down and 1884 respectively, and then obtaining an estimate of output per manhour for 1882 by straight line interpolation.

again. Not until 1886 or 1887 was the price decline halted. Money wages showed little change in 1884-1886, and then increased through 1890 or 1892. The result was the considerably smaller annual increase in real wages in 1888-1892 than in 1883-1887.

Assuming that increases in productivity were distributed evenly over the period 1883-1892, the abrupt shift of income in favor of wages beginning in 1883 either slowed considerably or was reversed altogether in the period 1887 or 1888 to 1892. This assumption may not be realistic. But output per manhour would be expected to increase, if it changes at all, when the rate of growth of output increases after a period of decline. The rate of growth of GNP did increase around 1888. Thus it is likely that if output per manhour did not increase at an even rate in 1883-1892, the rate of increase was larger after 1887, | when the rate of increase in real wages decreased. This supports the conclusion that the shift in income to wages either declined markedly or was even reversed after 1886 or I887.

percent in the years 1893-1899, but most of this increase came after 1896. In the years 1893-1896 output per manhour declined slightly on balance. At the same time, money wages were charac-

[21] Ibid.

terized by downward flexibility, and the decline in wages was either about the same, or less than the decline in prices. This suggests that there was either no shift in relative income shares in these years, or a slight shift away from profits.

8.3 Income Distribution and Economic Growth

Table VIII-5 summarizes the above discussion concerning income distribution. What effect did these shifts in income shares have on the growth of output? Chart VIII-8 shows some interesting relationships. GNP increased rapidly in the years 1873-1881, and slackened somewhat in 1882. Capital formation behaved in a somewhat similar fashion. As Chart VIIIT8 shows, in no other years did GNP grow as rapidly as in 1873-1881 or 1882. These same years showed growth in capital formation equalled only by the rate of growth in 1888-1891.

The strong downward flexibility of money wages in this period permitted increases in productivity to be taken almost entirely in the form of increased profits. Producers behaved as one would expect, and responded to the stimulus of sharply increased profits with rapid increases in production and capital formation.

Both GNP and capital formation show a sharp decline in their rates of increase during

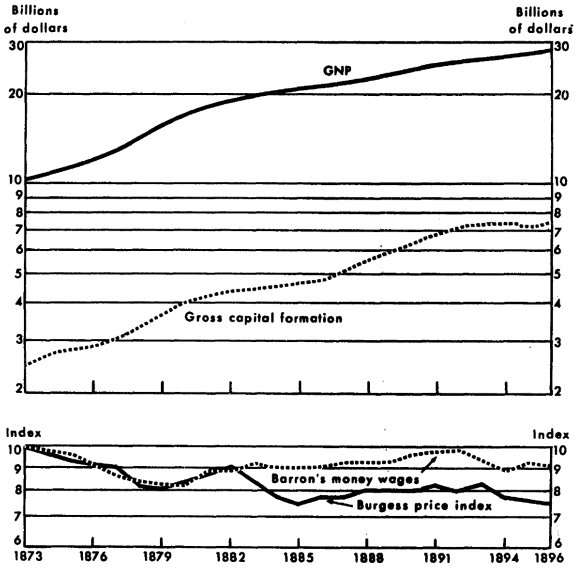


Chart VIII-8. Gross National Product, Gross Capital Formation, at Constant 1929 Prices, Hourly Wages, and Prices, 1873-1896.

Source: Gross National Product and Gross Capital Formation: same as Chart VIII-1, Barron's Wages, same as Chart VIII-5; Burgess Price Index, same as Chart VIII-6.

and Prices, 1873-1896. Source: Gross National Product and Gross Capital Formation;

1883-1837. The years 1883-1886 or 1887, as we have just seen, were characterized by a sharp reversal of the flow of income away from wages. The resulting decline in the share of profits in income was accompanied by declining rates of economic growth. This decline in the relative share of profits, coming quickly and reversing a trend in the other direction must have reduced absolute profits a well. Again, producers responded to declining profits just as might be expected.

301

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TABLE VIII-5

TRENDS IN REAL WAGES, PRODUCTIVITY AND INCOME DISTRIBUTION, 1873-1899

Period	Real Wages	Productivity	Shift of Income in favor of:
1893-1896	Constant	Negative or Constant	No Shift
1887-1892	Increase	Increase	Profits
1883-1886	Increase	Increase	Wages
1873-1882	Constant or Slight Increase	Increase	Profits

Increase Wages 1873-1882 Constant or Increase Profits Slight Increase The rate of growth of capital formation increased sharply in 1888, and this rapid growth continued through 1892. The rate of growth of GNP also began to accelerate in 1888, and the rapid rate extended through 1891, but the increase was not as dramatic as that of capital formation.

It was in the period 1888-1892 that the relative shift of income away from profits and toward wages was either greatly reduced or reversed completely. The increased rate of growth of GNP and capital formation must have been due partly to this development. The increased economic growth in these years may also have been spurred by the reversal in 1886 or 188? of the steep decline in prices which hac} persisted since 1882, and perhaps by a decline in the real rate of interest.

On the other hand, this downturn is discernible in the behavior of GNP by only a decline in the rate of increase. In fact, there is only a slight decline in the rate of growth of GNP in the period 1893-1896 from the rate in 1888-1892.

There was little if any change in relative income shares in 1893-1896, so the changes in capital formation and output can not be readily explained in that manner. But the fact that wages increased by the same amount as prices in this period was a relative setback for profits, and this might account for part of the decline in the rate of growth of output. It was suggested earlier that producers responded to the financial crisis of 1893 by reducing investment. Total output, though, failed to react as strongly. Nevertheless, the slackening in the rate of growth of GNP in these years must have been due in large part to the financial panic. After 1896, the dispute over the money supply and the monetary system ended as increased gold production brought the decline in prices to an end. The removal of this source of agitation and the prospect of increasing prices undoubtedly stimulated the growth of output after 1896, along with the lag of wages behind prices in these years.

The conclusions reached above concerning changes in income shares in the years 1873-1896 are generally supported by Budd, with the significant exception of the years in the l870Ts, when Budd asserts that no changes, or only a slight shift away from wages occurred in relative income shares. On the other hand, there is other evidence which supports the view that labor's relative share in income declined in the 1870's. The evidence indicates that a strong stimulus to production was provided in the deflationary years of 1873-1896 by the increasing share of income received by profits at the expense of a decline in the wage share of income. Variations in the rate of growth of output over these years of declining prices correspond very closely to changes in the magnitude of the redistribution of income. The behavior of money wages was a key variable in this process. In these years, money wages generally exhibited more than enough flexibility to insulate the economy against a declining price level.

Why did wages exhibit downward flexibility? The extent of the decline in wages in 1873-1879 particularly suggests that forces other than a declining • price level exerted downward pressure on wages. What might these other forces have been?

It seems unlikely that decreases in the demand for labor would have been present to exert downward pressure on wages. The vigorous growth of output while prices were declining could hardly have been accomplished with fewer workers. The downward pressure on wages which kept money wages in the years 1873-1896 from ever exceeding their level of 1873 must have originated from increases in the supply of labor in excess of increases in demand for labor.

8.4 Immigration

One primary source of an increased supply of labor is population growth. From 1870 to 1900, the number of gainful workers in the economy increased by 125 percent. In the same period, total population increased by 91 percent. The increased supply of labor could not have come from population growth alone. Now the gainful worker concept does not correspond exactly with the labor force concept, but, as was pointed out earlier, it is the only indicator of labor force changes available for these years. The more rapid increase in gainfully occupied could have resulted from increased participation rates for each age segment of the population, a change in the age distribution of the population, or both.

The largest relative increase in the gainfully occupied for any decade from 1870 to 1900 occurred from 1880 to 1890, but the increase of 36 percent was only a little larger than the increase from 1870 to 1880. Total population increased in these two decades by 25 and 26 percent respectively. For the period 1873-1879, when money wages were falling so rapidly that the real wage probably did not increase much, it seems improbable that labor force participation rates would have increased enough to allow the gainfully occupied to increase more rapidly than the population. Such an increase in the quantity of labor supplied would normally suggest a negatively sloped supply of labor curve, which is so unlikely that it can be ruled out. On the other hand, a significant shift in the age distribution of the population over a ten year period that would have resulted in an increase in the supply of labor sufficiently in excess of population growth also seems unlikely under normal circumstances.

But population growth in the period of deflation was not normal in the sense that it differs from most other periods in U. S. history because of the heavy immigration flows which took place during that time. This heavy inflow of immigrants contributed substantially to the increase in population during the years of deflation and resulted in an upward shift in the age distribution of the population. It is also likely that the immigration resulted in higher labor force participation rates.

From 1870 to 1900, immigration accounted for 33 percent of the total increase in population in the United States. In the decade of the 1880's, when immigration per thousand of population reached its peak during the deflation, immigrants comprised 42 percent of the total increase in the population of the U. S. This extraordinary influx of immigrants into the U. S. represented a great increase in the supply of labor, and thus must have exerted tremendous downward pressure on wages.

Table VIII-6 gives an indication of the impact of immigration on the supply of labor in the years of deflation. The pressures for able bodied immigrants to enter the labor force upon arriving in the U. S. must have been considerably more intense than the pressures upon those already established in the U. S. The immigrants, with the possible exception of those with relatives with whom they could live, were faced with the immediate need to provide food, clothing, and shelter. It would be expected that immigrants would enter the labor force at an earlier age and that the labor force participation rate for both male and female immigrants in all age groups would be higher for immigrants than for the native born population. As Table VIII-6 indicates, if all immigrants over the age of fourteen had entered the labor force, they would But all immigrants over fourteen years old probably did not enter the labor force. In 1890, the earliest year for which the labor force participation rate for all persons fourteen years of age and older is available, 52 percent of all such persons were members of the labor force. This figure has fchanged little since that time. Assuming that this participation rate applies to immigrants fifteen years old and over entering the labor force, immigration would account for 31 percent of the increase in gainfully employed from 1870 to 1900. For the period from 1870 to 1880, when money wages declined most, immigration would have accounted for only 26 percent of the increase in gainfully employed. For the decade from 1880 to 1890, which includes the sole period when money wages moved in the opposite direction from prices, immigration would have been responsible for 34 percent of the increase in gainfully employed. For the decade 1890-1900, the figure would be slightly lower.

TABLE VIII-6

INCREASE IN GAINFUL WORKERS AND IN IMMIGRANTS 15 AND OVER, 1871-1900

Period	Increase in Gainful Workers (1)	Increase in Immigrants 15 & Over (2)	Ratio of (2) to (1) (3)
1891-1900	5,230,000	3,298,694	.62
1881-1890	6,350,000	4,125,554	.65
1871-1880	4,470,000	2,240,407	.50
1881-1900	16,150,000	9,664,655	.60

Source: Col. (1), Same as Table V-2.
Col. (2), Historical Statistics, Series C136-137, p. 62.

have accounted for 60 percent of the increase in gainful workers in the years 1871-1900. These figures are higher than the portion of population increase due to immigration because a higher percentage of immigrants were fifteen years old and over than for the entire population.

But all immigrants over fourteen years old probably did not enter the labor force. In 1890, the earliest year for which the labor force participation rate for all persons fourteen years of age and older is available, 52 percent of all such persons were

These figures, though, would be too low. Not only was the age distribution of immigrants different than that for the native population, Ibut the sex distribution was also different. A higher proportion of immigrants were men. The labor force participation rate was different for men than for women, with men having a far higher rate. This would raise the labor force participation rate for immigrants above that of the total population even if the rates' for immigrant men and women were no different than those for the entire population.

The labor £orce participation rate for men in 1890 was 84. percent, and for women the rate was 13. percent. For the period 1870 to 1890, about 62 percent of all immigrants were men. Assuming that this proportion also held true for immigrants fifteen years old and over, the participation rate for all immigrants in this age group would have been at least 59 percent. Applying this rate to the increase in immigrants fifteen years and older from 1870 to 1900, 35 percent of the increase in gainfully occupied in these years would have come from immigration. This figure would be 30 percent for 1870-1830, 33 percent for 1830-1890, and 37 percent for 1890-1900. Even these figures

would be too low. The labor force participation rates apply to persons fourteen years old and older, but the age breakdown for immigrants indicates only those fifteen years old and older. In addition, as mentioned above, the pressures on immigrants to obtain jobs were probably greater than for those already established in the U. S.

It seems likely that immigration accounted directly for well over one-third of the increase in the gainfully employed in the U. S. during the years of declining prices. This great inflow of people from abroad directly entering the labor market and competing for jobs with those already there must have exerted tremendous downward pressure on wages throughout the era of declining prices. Apparently this downward pressure was sufficient even to keep the real wage from rising much in the years 1873-1832.

Immigration must have increased the downward flexibility of wages, rather than caused it. Immigration was relatively lightest in the years 1873-1879, when prices and wages declined most. On the other hand, it was relatively heavy in 1838-1892, when prices and wages moved upward together. Immigration apparently was a marginal factor which caused wages to fall more and rise less than they otherwise would have. If this analysis is correct, immigration caused wage changes which otherwise might have been a neutral factor to be a positive force for economic growth when combined with changes in productivity.

It is difficult to tell whether the heavy inflow of immigrants added to unemployment in the economy. The qualitative descriptions of this era of deflation indicate that unemployment was a great problem. The incidence of structural employment may have been high during these years as the U. S. was transformed from an agrarian state to an industrial state. But it is unclear whether unemployment increased among those who were qualified for jobs and were actively seeking work. Average daily hours showed very little year-toyear fluctuation over the entire period, and the slight but steady decline for 1873 to 1896 in average daily hours wa3 less than the decline in the decade immediately prior to 1873* Moreover, the downward flexibility of money wages seems to have been in response to increases in the supply of labor as well as in response to declining prices, and would have acted to combat unemployment.

There remains the question of wage behavior in the years 1883-1886 or 1887. As we have seen, this was the only period within the years of deflation when money wages failed to follow the direction of prices. Consequently, real wages increased in these years, and by more than the increase in productivity.

There does not seem to be an adequate explanation for this wage behavior.As Table VIII-7 shows, these were some of the peak years in the rate of immigration. Accordingly, as was shown above, immigration probably had its greatest impace on the labor force in the decade of the 1880*s. At the same time, the years 1883-1886 or 1887 saw a slackening in the rate of growth of output. This would tend to make resistance to wage increases greater than in earlier or later periods when rates of growth were accelerating.

There seems to have been only one unusual factor present in the years 1883-1887 which might have reduced the downward flexibility of wages. This was

313

TABLE VIII-7

IMMIGRATION RATES PER 1,000 POPULATION

Year	Rate	Year	Rate	Year	Rate	Year	Rate
1870	9.7	1878	2.9	1886	5.8	1894	4.2
1872	9.6	1880	9.1	1888	9.0	1896	4.8
1874	7.1	1882	14.9	1890	7.2	1898	3.1
1876	3.7	1884	9.4	1892	8.8	1900	5.9

Source: Long Term Economic Growth, Series A 124, p. 184.

the unusual labor union activity which occurred at this time. The organization which later became the American Federation of Labor in 1886 was organized in 1881. But

Economic Growth. Series A 124, p. 184. the unusual labor'union activity which occurred at this time. The organization which later became the American Federation of Labor in 1886 was organized in 1881. But the greatest labor union activity took place among the Knights of Labor.

The Knights of Labor achieved spectacular but short lived success in the 1880's. The Knights of Labor won a strike against the railroads in 1886, one of the first big successes of organized labor. From a membership of 300,000 in I885, the ranks of the Knights of Labor swelled to 700,000 in 1886, representing 8 percent of the non-farm labor force. After 1886, however, the Knights rapidly lost members, and had only 75,000 members in 1893* During the height of their activity, though, the Knights of Labor must have profoundly influenced far more workers than those who actually joined. Employers also must have been impressed by the growth of the Knights, and may have been reluctant to press for lower money wages for fear of aiding the cause of the labor movement. The decline was probably due to concerted opposition by employers and the rising money wages of 1886-1892 which took away some of organized labor's appeal.

The strong union movement of the 1880's undoubtedly was motivated at least in part by the failure of real wages to register significant gains in the 1870's, by the growth of big business, and by the heavy flows of immigration into the U. S. The growth of the Knights of Labor was meteoric, and must have had great influence outside its own membership. Still, it does not seem as if this phenomenon would have been powerful enough to inhibit downward wage flexibility throughout the economy. Nevertheless, wages exhibited downward wage flexibility in the presence of declining prices both before and after the growth and decline of the Knights of Labor. In the absence of a better explanation, this relationship between union growth and wage flexibility in the 1880's can not be dismissed.

Chapter 9

Summary and Conclusions

Because adequate quantitative data for the American economy in the post Civil War years of the nineteenth century has been made available only in comparatively recent years, those wishing to obtain a picture of economic events in these years have had for a long time to rely mostly on the qualitative descriptions of historians. Much of the well known literature covering the years 1873-1896 has focused on one of the central political and economic issues of that time, the issue concerning the size and composition of the money supply. This issue aroused passions and provoked bitter debate among all elements of the economy because the years 1873-1896 were characterized by a secular decline in prices. Only after the defeat of William Jennings Bryan in the presidential campaign of 1B96 was this issue laid to rest.

Focusing on the monetary issue, which even led to the formation of a third political party in 1892, as well as on other evidences of economic and social unrest, historians have generally described the years of deflation as years of deep economic stagnation as well. But the quantitative historical data which has been generated in recent years has cast doubt on the validity of this traditional picture of the U. S. economy during the years of deflation. Far from showing the years 1873-1896 as years of depression, abundant recent quantitative evidence shows that these years were characterized by sustained rapid economic growth. In terms of the long term historical growth of the American economy, some of the most rapid growth on record took place in these years.

Why, then, did historians fail to recognize the extraordinarily rapid growth of output which took place in these years, and instead record these years as years of depression? And it should again ^e noted that historians were not alone in their mistaken views of this period. The National Bureau of Economic Research recorded the period from October, 1873* to March, 1879, as the longest contraction in its reference cycle series. One reason for these mistaken views has been the incorrect supposition that great social unrest is incompatible with rapid economic growth. Another reason is the belief, held by many during the years of deflation and no less popular today, that a falling price level is utterly incompatible with rapid economic growth. To those holding this belief, the terms deflation and depression are synonymous.

In fact, these terms are not synonymous. The belief that a falling price level is destructive to profits and the incentive to produce, and the heat and noise generated by the social unrest led historians to overlook the rapid economic growth of these years, even though the best qualified observers on the scene during those years recognized this rapid growth and recorded their impressions of it in the journals of the day.

Economic theory shows clearly that a declining price level can be neutral in its effects on economic growth. A declining price level initially tends to increase the real rate of interest, and this would tend to depress the rate of capital formation. But a declining price level will also bring about shifts of the investment and savings function as investors and savers react and adjust to the new condition of deflation. These shifts may result in a lower nominal rate of interest which would offset the effects of the declining price level and so maintain real interest rates and thus investment at their pre-deflation level. Indeed, investment in the new equilibrium may even exceed that in the old.

The key to the protection and maintenance of profits during deflation is wage flexibility. If wages are flexible in a downward direction, then employment and output will be maintained as all costs of production fall along with prices for finished output. Only under the implausible assumption that creditors are willing to accumulate forever their windfall gains from deflation would a permanent gap between aggregate demand and full employment output develop, with prices and wages falling endlessly.

Deflation need not be incompatible with rapid economic growth as far as economic theory is concerned. A declining price level can be neutral in its effect on economic growth so that if the conditions for rapid growth are present, that growth can proceed unhindered by the deflation. Whether deflation is, or has been, a deterrent to rapid economic growth is thus a question of fact.

Estimates of output which are now available indicate that GNP increased at an average annual rate of almost 5 percent during the period 1873-1896. The growth of GNP did not proceed evenly throughout the period, however. The years 1883-1886 or 1887, and 1891 or 1892 to 1896 were marked by slower rates of increase in GNP than for the rest of the period. The most rapid growth in GNP for the entire period occurred in the period 1873-1882 when GNP increased at an average annual rate of well over 7 percent.

The economic growth during the years of deflation occurred on a broad front. The railroads expanded rapidly in these years and attracted much attention because of their involvement in the periodic financial panics which occurred intermittently during this period. These years were also the beginning of the steel industry in the U. S. Agriculture, too, expanded rapidly, but failed to keep pace with the rest of the economy, so that the U. S. became increasingly industrialized in these years of falling prices. Another notable feature throughout this period of deflation was the high rate of capital formation.

Population increased throughout the entire period of deflation at a steady but rapid rate of about 2.[1] percent per year. Growth of GNP and population combined to produce a rapid rate of increase in per capita income in the years 1873-1882 and a much slower increase in the remainder of the period. In the years 1883-1886 and 1893-1896, per capita income increased only by a very slight amount.

Price indexes for the years 1873-1896 show similar timing of changes in prices, but disagree considerably concerning the magnitude of the decline. A maximum estimate of the decline in prices over the period would be about 50 percent, or an annual average decline of 2. percent. A minimum estimate would be a decline of 18 percent. The four price indexes examined in this work all agree, though, that the most rapid and sustained decline in prices occurred during the years 1873-1879. Similarly, all four indexes show the secular decline in prices was interrupted in the years 1880-1882 when three of the indexes show a sharp increase in prices, while the other index shows constant prices. Another steep decline in prices occurred after 1882 and persisted through

[1]Maurice Allais, Economie et Interet (2 vols. Paris: Imprimerie Nationals, 1947), Vol. I.

1885 or 1886, after which prices pursued an irregular downward trend through 1896. The decline in prices, like the growth of this period, occurred on a broad front throughout the economy. In general, the decline in prices in these years was due to the failure of the money supply to increase as rapidly as output. The failure of the money supply to keep pace with output was due largely to uncertainty concerning the role of gold and silver, and the failure of gold production to keep pace with the international monetary demand for gold.

Not only was the entire period of deflation characterized by rapid growth, but the years of most rapid growth within the period were also the years of the most rapid decline in prices. Did this rapid growth occur despite the deflation, or was the deflation neutral in its effect on growth? Interest rates apparently declined after 1873 until 1886, showing irregular movement up and down with no trend in either direction from 1886 to 1896. This decline acted to offset the effect of deflation on real interest rates, keeping the real rate of interest lower than it would otherwise have been.

Money wages, whose behavior was critical to the maintenance of economic growth in the presence of deflation, did exhibit two-way flexibility. Money wages generally moved in the same direction as prices throughout the entire period of deflation. Downward wage flexibility was especially great in the period 1873-1879, when the most prolonged and deep drop in prices occurred. The decline in money wages may have even exceeded the decline in prices in this period. Wages also fell sharply in the period 1893-1896. The only significant exception to the harmony in the direction of price and money wage changes was the period 1883-1886 or 1887. Prices fell sharply in these years, but money wages, which had increased along with prices in the years 1880-1882, failed to decline, and instead remained constant. For the period of deflation as a whole, money wages displayed the flexibility necessary to offset the economic effects of declining prices.

Wages in fact decreased by more than enough to offset the effect of the rapid price decline over the period 1873-1879. While real wages at best increased only very slightly in the years 1873-1882, or may have even decreased, productivity was increasing so that a shift in income distribution away from wages and toward profits occurred. In 1883-1886 or 1887, when money wages remained constant while prices declined, real wages increased by more than productivity so that a shift in income in favor of wages took place. This relative shift of income away from pro-^ fits was halted or reversed in the years 1888-1892 when prices began to increase. There was little or no shift in income distribution during the years 1893-1896. For the entire period 1873-1896, real wages increased by less than productivity, so a redistribution of income in favor of profits occurred.

No data on profits is available for the years of deflation. However, assuming that profits provide the incentive for production and capital formation, profits must have been substantial throughout the years of falling prices. The behavior of industrial stock prices, which fell less than all prices, supports this view of profits. The shifts in income toward or away from profits acted at the margin to magnify or reduce the already substantial profits. For the entire period, profits were enhanced by the redistribution of income.

Output and capital formation, strong throughout most of the period of deflation, reacted to the shifts in income distribution just as would be expected. Those years in which relative income shares shifted toward profits were the years of most rapid growth in GNP and capital formation, while years in which income shifted away from profits were years of slackened rates of growth in these variables.

The shift of income away from wages on balance for the entire period of deflation suggests that downward pressure on wages existed apart from the general decline in prices. This pressure probably originated from factors affecting the supply of labor. One factor which must have exerted

great downward pressure on money wages by acting to shift the supply of labor curve to the right was the great immigration which occurred in these years. For the entire period of deflation, well over one-third of the increase in gainful workers must have come from immigration.

One apparent paradox is the behavior of wages in the years 1883-1886 or 1887. These were the years of the highest rates of immigration for the whole period, and among the highest rates of immigration the U. S. has ever experienced. Yet, as we have seen, these years form the single instance when wages did not move in the same direction as prices, failing to fall as prices declined. The result, as we have noted above, was a shift in income distribution away from profits and toward wages, with an accompanying slowdown in the rate of growth of GNP and capital formation. The stickiness of wages in the face of the highest immigration for the years 1873-1896 does not seem to be easily explained. One factor which may have influenced wage flexibility in a negative manner during these years was a dramatic increase in union membership and activity. The American Federation of Labor was formed in 1881 and became increasingly active in the following years. But it was the Knights of Labor which provided the spectacular union success in a strike against Jay Gould's railroads in 1886. As a result of their success, the Knights of Labor achieved a spectacular but short lived increase in labor union membership. This short lived success of labor may have resulted in increased wage stickiness.

The shifts in income which occurred during the long period of declining prices at least partially explain why such great unrest and agitation accompanied the great increases in output. The initial years of declining prices saw little or no increase in real wages, while other income shares were expanding rapidly. There existed at that time, just as today, a prevalent belief that a falling price level must be accompanied by economic stagnation. It was thus natural that labor should hold deflation responsible for the failure of the real wage to increase as rapidly as other income shares. Labor thus failed to share equally in the formation. The stickiness of wages in the face of the highest immigration for the years 1873-1896 does not seem to be easily explained. One factor which may have influenced wage flexibility in a negative manner during these years was a dramatic increase in union membership and activity. The American Federation of Labor was formed in 1881 and became increasingly active in the following years. But it was the Knights of Labor which provided the spectacular union success in a strike against Jay Gould's railroads in 1886. As a result of their success, the Knights of Labor achieved a spectacular but short lived increase in labor union membership. This short lived success of labor may have resulted in increased wage stickiness.

Some of the agitation of these years was directed toward immigration. But it,does not seem that the role of immigration as one of the prime factors affecting income distribution in this period was fully recognized. Organized and highly influential and vocal groups such as the silver interests, who stood to gain from a decision to expand the money supply and its base, seized upon the issue of deflation and were successful in persuading groups such as labor that their economic ills were caused by deflation.

Farm groups joined the silver interests in their efforts to expand the money supply and reverse the decline in prices. Although the farm sector expanded rapidly during the years of deflation, and enjoyed a shift in the terms of trade in their favor as farm prices declined less than all prices, it failed to expand as rapidly as the entire economy. The relative decline of the farm sector was due mostly to factors not related to deflation, and the relative decline in the farm sector has persisted to this day. But farmers saw the burden of their debt increased by falling prices. And even if they were able to more than offset this through improvement in their terms of trade and increases in productivity, these other limitations on the growth of agriculture did not permit them to expand as

rapidly as other sectors of the economy. Moreover, a great movement westward in farm production occurred during the years of deflation, and many of those farmers who remained in the East were beset with problems of soil depletion and found it difficult to offset the increased burden of their debt and compete with the more efficient Jfarms in the West. Thus many farmers prospered but still lagged behind the advance of the entire economy, and found in falling prices a convenient source of blame for their failure to keep pace. Those farmers who experienced difficulties because of the increased burden of their debt were more justified in blaming their ills on deflation, but still faced the problems posed by the westward movement of agriculture.

The financial panics which occurred during the years of deflation also focused attention on the falling prices and resulted in demands for expansion of the money supply. Even though these panics were little reflected in the behavior of output, they resulted in highly visible bank failures and financial chaos. Speculative activities involving the railroads were a primary cause of these panics. Nevertheless, deflation and inadequate growth in the money supply were pointed to as a major source of the problems facing the banks.

The widespread discontent manifested during parts of this period may have been associated with the behavior of income per capita. Per capita income increased at an average annual rate of about 2. percent over the entire period. But the most rapid growth in per capita income occurred in the years 1873-1832, when income distribution shifted away from wages. A combination of rapid population growth and adverse shifts in income shares must have kept the increase in income per capita of wage earners from reflecting the rapid growth of GNP.

Firms were the beneficiaries of the shift in income distribution during the period of deflation, especially in the years 1873-1832, the initial years of falling prices. This fortuitous everitmust have aided firms in offsetting the increased burden of debt contracted before the decline in prices began. This increased burden of pre-existing debt can not be evaded. Although it in no way affects the expected profitability of future investment, and so has no effect on economic growth in this respect, the increased burden of prior debt might result in the failure of the firm. Widespread business failures would affect economic growth.

Business interests were for the most part absent from those groups demanding an expansion of the money supply and the reversal of the price decline. This alone supports the view that deflation did not destroy profits. It is evident that firms had little trouble in absorbing the increased burden of prior debt. The vigorous expansion of the 1870's apparently combined with the increased share of profits in income to accomplish this.

9.1 Economic Growth and Social Unrest

The experience of the U. S. in the years 1873-1896 serves to underscore a point illustrated so well by the experience of the U. S. in recent years; that rapid economic growth need not be accompanied by domestic tranquility. How fast an economy grows is a question apart from how the economy grows.

The rate of growth of GNP says little about how the economic status of individuals is affected by growth. If population is also increasing rapidly, the effect of rapid economic growth on per capita income will obviously be diluted.

Even rapid growth of per capita income does not insure an increased living standard for all sectors of the economy. Structural unemployment seems to have been present during the years of deflation. New industries, such as the steel industry, requiring new skills were born during these

years. The failure of agriculture to keep pace with the rest of the economy meant a transfer by many individuals from the farm to the city. Wages exhibited downward flexibility and average weekly hours declined by a smaller amount than their historical trend, yet Coxey's Army of the unemployed made its famous march in these years.

Even those who maintain their employment during periods of rapid increase in per capita income may not find their living standard increased in the same proportion. Shifts in the distribution of income may prevent all income recipients from sharing equally in the increased output. Those who fail to maintain their share of income may realize little improvement in their living standard while others register sizeable gains.

Such a redistribution of income accompanied the rapid growth of 1873-1896. The general shift of income shares in favor of profits and away from labor, especially in the 1870's may have been an important factor in the increased activity of organized labor in the 1880's. In any case, labor was a major source of unrest in the years of deflation. Labor mistakenly pointed to the decline in prices as the source of their failure to share equally in the increased output.

Even groups which prosper during periods of rapid growth may express their unhappiness because their incomes are not increasing rapidly enough. Agriculture is a case in point during the years of deflation. Farmers achieved rapid gains in these years even though agriculture failed to increase as rapidly as the rest of the economy.

9.2 Growth and Deflation, 1873-1896

There can, of course, be no question that rapid economic growth can occur in the presence of deflation. The experience of the United States in the years 1873-1896 provides conclusive and overwhelming proof of this proposition. In the light of this evidence, one can only wonder why this question is still actively debated.

Showing that deflation and rapid growth can occur together still does not answer the question concerning the effect of deflation on the rate of growth. Is deflation a factor working at the margin to keep the rate of growth lower than it otherwise would be? Specifically, would economic growth have been even more rapid in the years 1873-1896 in the absence of deflation?

Intuitively, it is difficult to conceive of growth as proceeding at a more rapid pace in these years in the absence of deflation. The annual average rate of growth for the entire twenty-four year period, for example, was greater than that for the recent period of rapid growth 1960-1965. Capital formation was also at historically high levels. These years of deflation thus rank historically at or near the top in terms of economic growth in the U, S.

The usual theory which contends that deflation will impose a drag on economic growth postulates wage inflexibility, and shows that this will cause profits to decline and unemployment to develop. It also points to increases in the real rate of interest as a depressing factor on capital accumulation. None of these factors seems to have been characteristic of the years 1873-1896. Wages did exhibit downward flexibility, and their deep decline in the years 1873-1879 permitted those years of the most rapid decline in prices to be also the years of the most rapid increase in output. This marginal downward flexibility was apparently due largely to the great immigration of these years, and so was not related to movements in the price level. The shift in income created by *It might be argued that immigration itself would have been greater had deflation not been present. But the rates of immigration in those years were among downward pressures on wages undoubtedly stim-

ulated production, but this stimulus depended on downward wage flexibility for its effect, and not on a declining or increasing price level.

The decline in nominal interest rates over much of the period acted to counter the upward pressure of deflation on real interest rates. Downward flexibility in wages and a decline in nominal interest rates combined to offset the effects on economic growth of the decline in prices. With the deflationary monetary policies neutralized, the economy was able to respond freely to other economic forces. The forces conducive to rapid economic growth which were present in these years of deflation were able to perform their work unhindered by the decline in prices. It therefore seems unlikely that economic growth would have been more rapid in the hbsence of falling prices.

The theory that deflation exerts a drag on economic growth does not apply to this period of deflation because the assumptions of this theory did not hold true at this time. Wages were not inflexible in a downward direction, and shifts in the savings and investment functions resulted in lower nominal interest rates and increased capital formation. the highest in U. S. history. Moreover, the decline in prices was not confined solely to the U. S., but occurred in Europe as well, where most of the immigrant flows in these years originated.

9.3 Downward Wage Flexibility and Immigration

Was the critical downward wage flexibility of the years 1873-1896 due completely to the heavy immigration of those years? If it was, then the rapid growth of those years was largely made possible by the fortunate coincidence of heavy immigration during a period of deflationary monetary policy. In this case, rapid growth in the presence of deflation could be considered an exception to the general rule that deflation exerts a drag on growth, for the heavy immigration was a special circumstance of those years.

Downward wage flexibility is an effect, and not a cause. Downward wage flexibility means simply that wages decline when downward pressure is exerted on them. Downward pressure might result from a decrease in demand for labor, a rightward shift in the supply of labor, or both. It does not seem reasonable that wages would exhibit downward wage flexibility in response to an increase in the supply of labor, but not in response to a decrease in demand for labor. That is, it does not seem likely that wages would exhibit downward flexibility only in response to a particular source of downward pressure. If this is correct, then immigration was an additional factor, and not the sole factor, exerting downward pressure on wages. Declining price levels lowered the marginal productivity of labor, shifting the demand for labor curve leftward. This also exerted downward pressure on wages.

Money wages fell most rapidly when prices fell most rapidly, and not when the rate of immigration was highest. Indeed, the highest rates of immigration in the entire period were accompanied by relatively sticky wages. Downward wage flexibility in this period of deflation does not seem to have been dependent on heavy immigration.

9.4 Deflation and Capital Formation

It was shown in Chapter II that deflation would normally result in a leftward shift in the investment schedule and a rightward shift in the savings schedule. Investment in the new equilibrium would depend on the extent of the shifts. But it has been suggested that a declining price level

might tend to result in an actual decline in real capital formation. According to this line of reasoning, a declining price level decreases the cost of holding wealth in the socially fictitious form of cash balances. At the same time, the cost of holding wealth in the form of socially productive real capital will be increased by deflation. The result would be a substitution of cash balances for real capital as a means for holding wealth, and so a reduction in capital formation.

This result is a possible consequence of deflation, but it is contrary to the experience of the deflation of 1873-1896. If the nominal rate of interest declines enough, the cost of holding wealth in the form of real capital will decrease sufficiently to offset or more than offset the decline in the cost of holding cash balances. Nominal interest rates did decline during the years of deflation, and capital formation increased at a rapid rate.

9.5 Deflation and Growth Today

It is unlikely that deflation in our present U. S. economy would be neutralized as it was in the years 1873-1896. The crucial element present in those years, downward flexibility in wages, is absent from our present day economy. Deflationary monetary policies would generate unemployment and reductions in output instead of decreasing money wages, and these forces would nullify factors favorable to rapid economic growth. The theory that deflation will be a deterrent to rapid economic growth thus seems more applicable to the present U. S. economy.

The experience of the period of 1873-1896 revealed only a brief time span when money wages did not move in the same general direction as prices, and that was a period of peak labor union activity. There is much debate over the question of the ability of labor unions to obtain wages higher than they would be in the absence of unions, but there is general agreement that labor unions have increased resistance to decreases in money wages, and thus have contributed to increased wage rigidity.

But it is not only labor unions that have contributed to downward inflexibility of wages. The Employment Act of 1946 in effect committed the government to the maintenance of high levels of employment. Expectations have been generated that monetary and fiscal policy will be employed to restore high levels of employment if employment levels should drop. There is thus doubt that deflationary monetary policies will ever be allowed to develop in the first place. If deflationary monetary policies were pursued, the generation of unemployment through failure of wages to decline would not be expected to last. The expectation that substantial unemployment will not be permitted to exist for any length of time has led to the belief that resistance to decreases in money wages will be supported by expansionary monetary and fiscal policy.

Even if this belief is erroneous, as in 1957 and 1953, the expectation is still present.

Restoration of downward wage flexibility in the U. S. would require the re-examination of government policy concerning the maintenance of full employment. It would also require an examination of the framework of collective bargaining in the U. S. If resistance by workers and their institutional representatives to decreases in money wages were overcome, government committments to maintain full general employment might become largely unnecessary. Deflationary monetary policies would not also be depressionary monetary policies, as the deflation of 1873-1896 shows so well.

But actual decreases in money wages may not be desirable today for a number of reasons. Consumer debt is much more important today than it has been in the past, and deflation accompanied by decreases in money wages would increase the burden of this debt, working hardships on con-

sumers. And after a long period of only upward wage and price mobility, harmful expectations might be generated by actual wage decreases. But downward wage flexibility in an important sense includes even the absence of increasing wages, or the willingness to forego money wage increases.

The important lesson to be learned today from the behavior of the U. S. economy in the years 1873-1896 may not be that deflation and growth are compatible. The important lesson may be that inflation is not a necessary condition for rapid economic growth.

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